

Supreme Court of the United States.

BOYDEN POWER BRAKE COMPANY

ET AL.,

Appellants,

VS.

GEORGE WESTINGHOUSE, JR., ET AL.,

Appellees.

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BOYDEN POWER BRAKE COMPANY

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Appellees.

Petition for Rehearing.

Your petitioners George Westinghouse, Jr., and the Westinghouse Air Brake Company, complainants and appellees, hereby respectfully represent to this Court as follows:

FIRST. That, as they are advised and believe, this Court has been led into error in its opinion filed May 9th, 1898, in finding that the "auxiliary valve" of Boyden (valve 22) is *located* and *arranged* in combination with the other parts of the triple-valve structure, in a substantially different manner from that of the auxiliary valve of the Westinghouse Patent in suit (valve 41), and so as to be productive of different results from those produced by the Westinghouse auxiliary

valve; and in finding that a passage for train-pipe air (admitted by said valve) *through* the valve chamber, is substantially different from a by-passage for train-pipe air *around* said valve chamber.

Whereas, as your petitioners believe, this difference in location of the auxiliary valves, and passages opened thereby, is *not* material, and has been so proved in the record, and is in substance so admitted on the part of the defendants in one of the Boyden Patents No. 481,136 (Record, pp. 817, 823).

SECOND. That, as they are advised and believe, this Court has been led into error in its finding that there is "*no partition in the proper sense of the word,*" in the valve structure of the Westinghouse Patent in suit, "*or, at least, none located as in the Boyden device,*" and "*no aperture in such partition open for the express purpose of maintaining differential pressures on opposite sides of a check-valve which opens in emergencies to admit train-pipe air to the brake cylinder.*"

Whereas, as a matter of fact, there has always existed in the said Westinghouse "quick-action" structure, and is described in the Westinghouse Patent in suit a restricted port 35, in an extension of the main valve, which constitutes a partition substantially of the character of that in the Boyden structure, and is located in substantially the same relation to the other parts of the structure, and said restricted aperture necessarily operates to produce "differential pressures" on opposite sides of the Westinghouse check-valve, and is productive of substantially the same results as those produced by the said restricted aperture in the Boyden structure, and this is substantially admitted in the record, and is clearly to be inferred from the said Boyden Patent No. 481,136 (Rec., pp. 823-4).

THIRD. That this Court has been led into error in supposing that the device of the defendants' is substantially different from that of Westinghouse, and "*is a novel one and a manifest departure from the Westinghouse Patent,*" because, as was supposed by the Court, Boyden "*made a more perfect brake than the one described in the Westinghouse Patent.*"

Whereas, there is no proof in the record that the defendants' device is, in any way, or to any degree, better, simpler or

more efficient in producing "quick action" or quickened "serial action" or "quick action without shocks," at the rear end of a long train, than the exact form of apparatus described and illustrated in the patent in suit, but, on the contrary, the proof is that the said Boyden valve is, if anything, inferior to that of the patent in suit.

In support of the first paragraph or section of this petition your petitioners respectfully represent as follows :

The location of the Boyden auxiliary valve 22 upon one side—viz., on the auxiliary reservoir side—of the triple valve piston (and hence *in* the valve chamber), instead of upon the other, or the train pipe side, of the triple valve piston (and hence *outside* of the valve chamber), and the consequent difference of flow of train-pipe air admitted by said valve *through* the valve chamber (as described by Boyden), instead of *around* the valve chamber (as described by Westinghouse) is admitted in the patent of Mr. Boyden himself to be a difference which does not affect either *essential* features of the structure, or the mode of operation or the result.

The Boyden Patent No. 481,136 (August 16, 1892, Record, pp. 817-828) describes a form of quick-action valve operating by the same "momentary differential pressures" (see Rec., p. 821, 5th line from foot of page) as the form involved in this suit, but differs therefrom by using a *slide* valve, instead of a *poppet* valve. Said patent contains several illustrations of *essentially* the same structure.

In one form (Figs. 2 and 11) train pipe air is admitted by a *by-passage* (containing a check valve) *around* the triple valve chamber, and, in another form (Fig. 12) train pipe air is admitted to produce quick action *through* the triple valve chamber.

Also in one form (Fig. 2) the "partition 9," with the "restricted port B" therein, is *movable* (substantially as illustrated in the Westinghouse Patent in suit), and in other forms (Figs. 11 and 12) the "partition" and "restricted port" therein (B¹ in Fig. 11, B² in Fig. 12) is *stationary*.

This Boyden Patent expressly admits that the two organizations of the structure *are substantially alike*. It says (p. 823, 8th line from bottom of page):

"The restricted passage B for the supply of auxiliary reservoir air when applying the brakes for emergency stops is shown in Figs. 2 and 10, for the purpose of clear illustration, as a small hole through the partition 9; but a special hole or passage is not necessary, as the partition 9 may fit the bushing *b* loosely enough to leave a small space between the rim 9^a of the partition and the wall of the bushing. Such looseness of fit, or the space formed thereby, may constitute the restricted passage, and I have used valves constructed in this manner. The restricted passage may also be formed as a distinct channel in the case, as at B¹ in Fig. 11 or as at B² in 12. *The partition may be located differently from what is shown in Figs. 2 and 11. It is obvious that it may be anywhere on the stem q², so that it is not withdrawn from the bushing when the piston completes its stroke to the left. It may also be stated that the piston may, under certain conditions, be made to serve as a partition. This is illustrated in Fig. 12.*

Fig. 12 illustrates a modification in the construction and arrangement of the parts of a valve embodying my invention. This form of valve, *although differently organized from that shown in Figs. 2 to 11, inclusive, has the same parts, or their equivalents, and has the same mode of operation and produces the same result. The valve shown in Fig. 12 differs from that shown in the other figures chiefly in that the slide valve of Fig. 12 is located on the train-pipe side of the actuating piston, whereas in the other figures it is located on the auxiliary-reservoir side of said piston.* (*Italics ours.*)

In further support of your petitioner's contention that the location of the partition, with its restricted aperture, and the location of the "auxiliary" valve, are not substantially different in the Boyden structure from those illustrated in the Westinghouse structure, your petitioner respectfully represents as follows:

In the Boyden structure in suit the "partition 9" is a fixed partition, located between the auxiliary reservoir and the triple valve chamber, and the "restricted aperture" of said partition restricts the free flow of air from the auxiliary reservoir to the brake cylinder for three purposes:

(a) To hold the high pressure at the back of the triple valve piston, so as to cause the piston to move when train pipe pressure on the opposite side is reduced.

(b) To prevent high pressure from existing under the check valve (in the passage from the train pipe), and thus permit said check valve to open.

(c) To supplement train pipe air with reservoir air (*slowly admitted*).

In the Westinghouse structure the part which acts as a "partition," and "restricted aperture" therein, is a *moving* part instead of a *fixed* part. It is the extended end of the main valve with the restricted port 35.

The operation and effect of that partition, and restricted aperture therein, is precisely the same as the corresponding parts of the Boyden structure, viz. :

(a) To hold the high pressure at the back of the triple valve piston, to cause it to move when train pipe pressure on the opposite side is reduced.

(b) To prevent high pressure from existing under the check valve (in the passage from train pipe) and thus permit said check valve to open.

(c) To supplement train pipe air with reservoir air (*slowly admitted*).

The fact that the partition in one case is a moving one, and in the other case a fixed one; and that in one case it restricts the flow of auxiliary reservoir air *into* the valve chamber, and in the other case *out of* the valve chamber (in *both cases on its way to the brake cylinder*), are shown to be immaterial differences by the express admissions already quoted from the patent to Boyden, No. 481,136.

In support of the second section or paragraph of this petition, your petitioners respectfully represent that, while it is true that the Westinghouse Patent in suit does not describe the restriction of size of the "Port 35" as being

"*for the express purpose of maintaining differential pressures on opposite sides of a check valve which opens in emergencies to admit train-pipe air to the brake-cylinder,*"

and although it is true that the Westinghouse Patent does not, in itself, state such "express purpose," yet the evidence shows that the Westinghouse valves made under said patent were always so constructed, and that the structure could not possibly have been operated to produce "quick action" unless so constructed as to contain a restricted passage through a separating partition (which prevents the *free* flow of auxiliary reservoir air at the time quick action is to be effected), and that this was well understood long prior to Boyden's alleged invention of the "partition" and "restricted port B."

Hence, as your petitioners respectfully represent, the use of a partition, and a restricted passage therein, cannot be claimed as a *novelty* by Mr. Boyden or those acting under him.

In support of the third section or paragraph of this petition, your petitioners respectfully represent that there is no proof in the record that the defendants' device is better, simpler or more efficient than that of Westinghouse, or has ever been introduced into public use on railroads to any considerable extent. But, on the contrary, the proof is that the said Boyden apparatus has never gone into extensive practical use, and is not to be distinguished from that of Westinghouse by reason of any greater efficiency, as will fully appear by reference to the citations from the record (and from public documents) in the brief accompanying this petition.

Your petitioners further represent, as a reason for a rehearing of this cause, upon the points specified in this petition, that the aspect in which this case has heretofore been presented upon the question of infringement has been principally, if not wholly, such as not to call the proofs relating to the specific contentions here presented, to the attention of the Court.

The contentions of the respective parties, as heretofore presented, have been chiefly upon the question whether the Boyden "valve 22" was or was not an "auxiliary valve" which performed the function of the auxiliary valve 41 of the Westinghouse Patent in suit in admitting train-pipe air to the brake cylinder in "quick action."

The contention on behalf of the defendants has been that the said Boyden structure contained only and solely a "main valve" and a "graduating valve," but *no* "auxiliary valve" for "quick-action."

The contention on behalf of the complainant has been that the valve 22 of the Boyden structure was essentially a "quick-action" "auxiliary valve," and not the "main valve" of a triple valve structure.

The question has not been, as your petitioners believe, thoroughly, if at all, argued, whether, *if* it should be held (*as this Court has now held*) that the valve 22 is *in fact* an "auxiliary valve" for "quick-action," the mere location of the same inside of the valve-chamber (on the auxiliary-

reservoir side of the triple valve piston) instead of outside the valve-chamber (or on the train-pipe side of the triple-valve piston), and the consequent incident of a passage for train-pipe air *through* the valve-chamber, instead of *around* it, and the further consequent incident of the location of the part which acts as a "partition" and "restricted port," to prevent free flow of auxiliary reservoir air, at the place where it *enters* the valve chamber, instead of at the place where it *leaves* said valve chamber, constitute material differences of structure or are productive of any materially different results.

Wherefore, your petitioners respectfully ask that this cause be reheard upon the specific question, whether the difference in location of the auxiliary valve 22 of the Boyden structure from that of the auxiliary valve 41 of the Westinghouse structure, and the consequent incident of a passage for train-pipe air through the valve chamber, instead of around it, constitutes a material and substantial difference between the two structures, and whether the difference in location and form of the restricted aperture to prevent the free flow of air from the auxiliary reservoir in "quick action," by locating the same in one case at the point where the air enters the valve chamber on its way to the brake cylinder (as in the Boyden structure), instead of locating the same at the point where the air leaves the valve chamber on its way to the brake cylinder (as in the Westinghouse structure), is a material and substantial difference; or whether either of said differences are sufficient to avoid the charge of infringement.

And your petitioners will ever pray, etc.

(Sd.) WESTINGHOUSE AIR BRAKE CO.,
 By GEORGE WESTINGHOUSE,
 President.
 (Sd.) GEORGE WESTINGHOUSE, JR.

We hereby certify that in our opinion the foregoing petition is well founded in point of law and in point of fact, and is not presented for delay.

FREDERIC H. BETTS,
 GEORGE H. CHRISTY,
 Counsel.



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Brief on Petition for Rehearing.

The decision of the majority of the Court rests largely upon a question which does not seem to have been fully, if at all, discussed.

The validity of the claims of the Westinghouse Patent in suit, so far as the question of novelty is concerned, has never been seriously disputed.

The only question has been in regard to the scope of the invention and of the claims.

On the part of the complainant infringement has been presented in two aspects :

FIRST. On the ground that the complainants were entitled to claim broadly, under their second claim, any quick-action triple-

valve apparatus in which the triple-valve piston, by a short or "preliminary" traverse, opened a port from the auxiliary reservoir to the brake cylinder, and which, by a longer or "further" stroke, opened a port from the train pipe to the brake cylinder.

If this position could be maintained, it became unnecessary, under the second claim, to discuss the question whether the valve which opened the train-pipe port was an "auxiliary" valve or not.

The majority of the Court has ruled against this construction of the second claim, and has held that an "auxiliary valve" is an implied element of the second claim.

SECOND: The second contention of the complainants was that the defendants' valve 22 was, in fact, an "auxiliary valve," and that, having all the other elements recited in the combinations of the 1st, 2d and 4th claims, this structure was an infringement of each of those claims.

The contention throughout the case on behalf of the defendants has been a denial that their valve 22 was, in fact, an "auxiliary" valve at all. Their contention has been that the valve 22 was the "main valve" of the triple valve, and that the valve *i, j, k* was a mere graduating valve.

This Court has ruled against the defendants on this contention; but, in the opinion of the majority of the Court, as we read the opinion, the difference in *location* of the defendants' auxiliary valve 22 is believed to be so different from that of auxiliary valve 41 of the Westinghouse Patent, and its arrangement in connection with an air passage *through* the valve chamber, instead of in connection with an air passage *around* the valve chamber, productive of such different results, and involving such a different mode of operation, that infringement has not been made out.

In connection with this issue the Court has held that, although in the Westinghouse Patent the *restricted port 35* is present, and necessarily produces that difference of pressure on opposite sides of the check valve which is essential to the opening of the check valve to admit train-pipe air for "quick action," yet this particular func-

tion of the restricted aperture, being not in terms adverted to by Mr. Westinghouse, is to be regarded as an incident to the form of the structure rather than as expressly in the mind of the designer. Hence it has not been recognized as the equivalent of the Boyden port B, in his partition.

If we are able to show that the *location* of the auxiliary valve inside of the triple-valve chamber, instead of outside of it, is an immaterial difference, then, as we respectfully submit, the two other differences above referred to must necessarily be held to be immaterial also, because they will then be seen to be mere incidents to the change of location of the auxiliary valve.

Thus, if the auxiliary valve be really an "auxiliary" valve, acting as such, but located in the valve chamber, instead of outside of it, then it follows of necessity, and as a mere incident, that the flow of air which it admits, when opened, *must be through* the valve chamber instead of *around or by* it.

One feature follows of necessity from the other.

Again, it also follows of necessity, from the location of the auxiliary valve *in* the valve chamber, that the point of *restriction* of free flow of air from the auxiliary reservoir must be situated to accord with such changed location of the auxiliary valve.

Train-pipe air at reduced pressure is to be allowed to flow past the auxiliary valve when opened. That is the sole purpose of such valve. When the auxiliary valve is open the reduced train-pipe pressure must also be sufficient to open a check valve in the line of flow thus opened. Hence, auxiliary-reservoir air *at higher pressure* must not be allowed to be present in the line of flow opened by the auxiliary valve; the flow of such air *at high pressure* must accordingly be restricted.

If the auxiliary valve is located *in* the triple-valve chamber, of course the free flow of high pressure auxiliary-reservoir air must be restricted *before* that air *enters* the valve chamber, on its way to brake cylinder.

If the auxiliary valve is located *outside* of the valve chamber,

then the free flow of high pressure air need not be restricted until it is *leaves* the valve chamber, on its way to brake cylinder.

Hence, the *place* of restriction of free flow of reservoir air (or location of the restricted port) is merely an incident to the location of the auxiliary valve.

In the Westinghouse structure the restriction is at the point where the reservoir air *leaves* the valve chamber, because the *auxiliary* "quick-action" valve is *outside* of that chamber, and the line of flow of train-pipe air is *around* the chamber—to brake cylinder.

In the Boyden valve, simply because the auxiliary valve is *in* the triple-valve chamber, the restriction of flow of high pressure air must take place *before* it enters the valve chamber, in the line of flow through that chamber to brake cylinder.

There is no other difference between the two structures, and, as we shall now proceed to show, change of location of the valve and of the restricted passage for the flow of train-pipe air is a mere change of location, not production of any new mode of operation, nor of any better or different result.

First Point. On the record, as it stands, defendants can not successfully argue that *in re quick action*, either the *location* of their partition 9, or the presence of a *central passage*, was a material or substantial difference.

As a part of their defense they offered in evidence three Boyden Patents, all of the same date (August 16th, 1892), and consecutively numbered. All of these three patents were asserted to be addressed to a common object, viz.: the production of "quick action" by the admission of train-pipe air, by a valve which, in each case, is *said* to be only the "main valve," whereby, as is said, "an auxiliary valve is dispensed with and 'quick action' by the admission of *train-pipe* air effected by 'momentary differential pressure'" (Rec., p. 821, foot of page).

The first patent of the three, No. 481,134 (Rec., p. 797), related to the first form of defendant's infringing apparatus, about which very little was said at the argument or in the briefs, since it had been superseded by the second form, and the differences between the two were not regarded as very material.

The second patent of the three, No. 481,135 (Rec., p. 809), related to defendants' second form of valve. This is the one which was chiefly discussed at the hearing and is illustrated with substantial correctness in the drawings, and skeleton diagrams next following pages 15 and 16 of the opinion.

The Court has held that the valve 22 of the patent is *really* an "auxiliary" valve.

The third patent, No. 481,136 (Rec., p. 817) relates to another form or construction of quick-action triple valves in which the *alleged* "main" valve is a *slide* valve instead of a poppet valve. Whether it, like valve 22 of Patent 481,135, is not really an "auxiliary valve" need not now be discussed, as such valve is not in issue in this case, but (as will be seen at p. 821, line 5, from bottom of page) it so far resembles the other two as to involve a like exploitation of Boyden's theory of "momentary differential pressures," and (pp. 827-8) of the value of a "partition," and of "a restricted port" therein.

Now a reference to this patent will show that the *location* of the partition 9, with its restricted port B "between the chambers C and D," is *clearly not a matter of importance at all* in respect to producing "*quick-action*" by admitting *train-pipe* air.

In the specification (Rec., p. 819), a little below the middle of the page, Boyden says:

"A restricted or small passage B through the partition 9 serves as an air communication between opposite sides thereof."

Referring now to Fig. 2 of these Boyden drawings (Sheet 2), it will be seen that the partition 9, with its restricted passage B, is *not* "between the chambers D and C," but is located in an extension of the piston stem at the right-hand end of the valve cham-

ber C, and connects with a *by*-passage to brake cylinder (*as in the Westinghouse Patent in suit*). In Fig. 12 (Sheet 5) the partition 9 is a *movable partition*, being the main piston itself (Rec., p. 824, lines 7 and 8), and the restricted port or passage B² is there located in the valve casing.

Mr. Boyden and his company, who introduced this patent, are not in position to argue that *in re quick action* the particular *location* of the partition 9 with its restricted port B, between the chambers D and C, involves any matter of substance, because in one figure (2) they show it located as in the Westinghouse valve, and in another figure located substantially as in the particular Boyden valve in suit (*i. e.*, between chambers C and D).

This patent of Boyden's, No. 481,136, therefore, supports our contention that the *location* of the partition and restricted port is not material in respect of quick-action, and that they may be located at any suitable point, either *between the valve chamber and passage to brake cylinder*, where Westinghouse shows them, or *at the end of the valve chamber next the piston*, as in the particular structure before the Court, or *at the end of the valve chamber furthest away from the piston chamber*, as in the Boyden Patent No. 481,136.

But Boyden, in this patent, goes still further, and specifically admits, what we have always contended for, that the *location of the partition is not material*. Thus (Rec., p. 824, lines 3-5), he says :

"The partition may be located differently from what is shown in Figs. 2 and 11. It is obvious that it may be anywhere on the stem *g*²," etc.

And again (Rec., p. 824) :

"Fig. 12 illustrates a modification in the construction and arrangement of the parts of a valve embodying my invention. This form of valve, *although differently organized* from that shown in Figs. 2 to 11, inclusive, *has the same parts or their equivalents and has the same mode of operation and produces the same result*. The valve shown in Fig. 12 differs from that shown in the other figures chiefly in that the slide valve of Fig. 12 is located *on the train-pipe side of the actuating piston*, whereas in the other figures it is located *on the auxiliary reservoir side of said piston*" (*italics ours*).

Hence, while we submit that the Court is in error in believing that *the particular location* of the partition 9 is a matter of substance, we can readily see that the error probably arose, as above stated, from a misapprehension of defendants' contention, and a misapprehension which was very liable to arise on account of the exceedingly complicated character of the mechanics of the case.

It will also be seen that in this same Boyden Patent No. 481,136, Boyden has shown that a *central passage*, through the triple-valve piston) and through the valve chamber, is not essential to his theory of "momentary differential pressures," for here will be found in Figs. 2, 5 and 11, a *by*-passage F¹, and a check-valve 26, controlling the flow of train-pipe air through such *by*-passage. And from this fact the inference is fairly obvious that *in re quick-action* there is no substantial or material difference between a "by-passage around the triple-valve chamber and a *through passage*."

Second Point. In respect to the Westinghouse Patent in suit, 360,070, the Court finds :

"The fact, however, that no suggestion is made in the patent of such a function of the restricted port 35, indicates either that none such had been discovered, or that it was not considered of sufficient importance to mention it. Indeed, it seems to have been an after-thought, suggested by the necessity of an answer to defendant's argument, based upon their partition 9. That when an auxiliary valve is opened there must be a difference in pressure above and below the check valve 49, in order to open it, is manifest ; yet, this is rather an incident to the Westinghouse device than the controlling feature that it is made in the Boyden patent " (Opinion, pp. 21, 22.

As to this your petitioners respectfully submit :

1. Differential pressures as a means of brake control had been a known and recognized branch of this art in the automatic system, and such fact abundantly appears from the testimony in the case.

Barnes, Rec., p. 373, fol. 578.

2. The main valve H of the Westinghouse automatic Patent 220,556 (Rec., p. 762) contained a service port s¹ for admitting *aux-*

iliary-reservoir air to the brake cylinder in the ordinary service applications of the brake, such port then being brought to register with the brake-cylinder port C. But when the brake was to be applied with *full force* the further traverse of the piston brought the extreme end of the valve H clear past the brake-cylinder port C, so that the latter was *wide open* for the *abundant* discharge of auxiliary-reservoir air into the brake cylinder.

And this is the feature on account of which the "further traverse" of this valve, as thus constructed, was rendered unsuitable for use for *quick-action* purposes (as was admitted in Mr. Hill's second brief, p. 12).

If this construction had been followed in Patent No. 360,070, *auxiliary reservoir* air would enter the brake cylinder *as freely and as fast as train-pipe air* could pass through the emergency port 42 of 360,070, and the latter, being of *less* pressure, "*quick-action*" would be impossible.

Hence, Mr. Westinghouse, in devising the apparatus of 360,070, made an extension of the extreme end of the main valve (called H in 220,556), and in that extension he made a small or restricted port 35; and this fact is specifically referred to by him in his specification (p. 3, lines 4-19), where he first enumerates the leading operative parts of the triple valve of 220,556, and then says (lines 9-12):

"But *under my present invention these are supplemented by a port 35, leading from the end of the valve adjacent to the opening of the chamber 24.*"

The port 35 is, therefore, a new feature introduced for some purpose in devising the quick "action" invention.

Next, what does the Patent 360,070 say about the relative sizes of the ports 35 and 42?

Of the port or passage 42, it says (p. 4, lines 34-42):

"Not only is there a passage of *considerable size* opened from the brake pipe on each car, whereby the pressure is more quickly reduced, but the air so discharged is utilized in the performance of preliminary work, it being found in practice that the air so taken from the pipe will exert a pressure of about twenty-five pounds in the brake cylinder" (*italics ours*).

Next, we have the following directions as respects the port 35 (p. 4, lines 43-67):

"When the piston 12 arrives at the extremity of its stroke, as above specified, *the supplemental port 35 of the slide valve 14 is brought into communication with the port 33 and passages 22 and 16, which serves to discharge the reservoir pressure into the brake cylinder, thereby augmenting the pressure already exerted in the brake cylinder by the air admitted from the main air pipe.* * * * The feed-opening for the admission of air from the *auxiliary reservoir* to the brake cylinder *is purposely made of comparatively small diameter*, it having been determined by experiment that the initial application of the brakes should not be made with maximum force, and this opening may be made of such size as to apply the brakes exactly in accord with the requirements of the most efficient work." (*Italics ours*).

Hence it is submitted that the Patent 360,070 clearly sets forth in substance the following facts:

(1) That the port 35, with the extension in which it is made, was added to the automatic main valve of 220,556, with reference to and for the express purposes of quick action.

(2) That the port 35 (for reservoir air) is "purposely made of comparatively small diameter."

(3) That the port 42 (for train-pipe air) is to be made of "considerable size."

And these ports being so made, it fully appears from the testimony that "differential pressures" *will certainly be attained*, and that *such fact was well known in the art* (*Barnes, Rec.*, p. 362, fol. 560 (*b*); p. 367, Q. 670; p. 373, p. 371, par. 1; p. 386, fol. 599; p. 406, Q. 701; p. 445, x-Q. 827; p. 453, x-Q. 852. *Newbury, Rec.*, p. 157, Qs. 199, 200; p. 160, Q. 202; p. 163, Q. 205; p. 212, x-Qs. 248-252. *Westinghouse, Rec.*, p. 276, fol. 424; pp. 285, 286, fol. 439; p. 287, Q. 417; p. 289, Q. 422).

Hence, it is submitted that the construction and operation referred to had been "discovered" by Westinghouse; that in respect thereof, sufficient "mention" was made to enable others skilled in the art to make and use it; that it should not be regarded as an "afterthought" nor a mere "incident to the Westinghouse device," and that as to these matters the Court was inadvertently in error.

Defendants did not deny the actual existence of this relation of the ports in the Westinghouse quick-action triple of 360,070. Nor did they deny that the flow of air from train pipe and auxiliary reservoir into the brake cylinder would, as a matter of fact, take place accordingly. Their leading expert, Mr. Church, says unhesitatingly in his direct examination, that the Westinghouse valve of 360,070 contains provisions for a *larger flow of train-pipe air* to the brake cylinder, in emergency use, than from the *auxiliary reservoir* to the brake cylinder.

This is merely the converse of the proposition that Westinghouse restricts the flow of auxiliary air.

Thus, Church says of 360,070 (Rec., p. 605, fol. 980) :

"The passages and ports through which *train-pipe* air is conducted, are *relatively larger* than those through which *auxiliary* air is conducted to the brake cylinder ; consequently, the flow of *train pipe* to the brake cylinder *would precede auxiliary reservoir air, and a relatively larger volume would pass in a given time*" (Italics ours).

Mr. Church tries to belittle the effect of this rapid admission of train-pipe air, but the *fact* is clearly admitted.

(See, also, the further testimony of the same witness in Re-d. Q. 239, Rec., pp. 656, 657, fols. 1059, 1060.)

It is undoubtedly true, however, that in the specification of 360,070—and this is perhaps what the Court had more prominently in mind—the particular operative or co-operative relationship between the restricted port 35 and the check valve 49, whereby, in consequence of the holding back of auxiliary reservoir pressure at the port 35 (except in small amount), train-pipe air at a *less* pressure will lift the check valve 49 and pass freely to the brake cylinder, is not specifically stated as a matter of importance.

But the *fact* remains—and by the facts, as we respectfully submit, we should be judged—that the relationship thus referred to *does actually exist* in the Westinghouse apparatus as shown and described, and also exists as a mechanically co-operative relationship, for the useful purposes for which the apparatus was designed. And it is still further a fact, as clearly appears from the citations made from the patent as above, that the devices thus referred to came

into this co-operative relationship, not *by accident*, but *were made so by design*, to the end that the hitherto unattained purposes and functions of quick action, in a *new kind* of train control, might be accomplished.

Indeed, as we understand, the Court has found the fact to be as we have thus represented. For it is admitted in the above extract from the opinion of the Court:

"That, when the auxiliary valve is opened, there *must be* a difference of pressure above and below the check valve 49 in order to open it, is manifest" (italics ours).

This being true, does it not necessarily follow that suitable means for securing "differential pressures" *actually existed* in Westinghouse's apparatus?

And, if it existed, it must, to the extent and for the purposes of its existence, be a "controlling feature" in the use of the Westinghouse valve, and as much so as in the Boyden.

Hence, if it actually existed, as the Court has found, in operative form in Westinghouse, any failure on the part of Westinghouse to fully appreciate or even to state its importance *cannot*, as we submit, *by any rule of law, inure to the credit of Boyden*.

Boyden is not entitled to high rank as an independent inventor, merely because he has *set forth* in his patent something as a "controlling feature," which, in substance and effect, was already present, and was, in fact, a "controlling feature" in Westinghouse's previously-existing valves, no matter who invented them, nor how defectively or imperfectly their functions were *described*, provided only their construction and operation were previously known.

Third Point. Your petitioners also submit that error of inadvertence also appears in the following finding of the Court:

"There is no partition [in Westinghouse] in the proper sense of the word—certainly none located, as in the Boyden device, between the chambers D and C, and no aperture in such partition opened for the express purpose of maintaining this differential pressure" (Opinion, p. 22).

If "partition" means something which mechanically affects

separation—and the mechanical test is the usual standard of judgment in patent cases—then it is believed that the finding that Westinghouse has no partition “in the proper sense of the word” is erroneous.

The extension on the end of the main valve, above referred to, with its restricted port 35, (which the Westinghouse Patent in suit expressly says is a “supplement” to the older construction of Patent No. 220,556), is *mechanically* as much a “partition” to effect separation between the auxiliary reservoir and the brake cylinder as is the Boyden partition 9, with its restricted port B; Nor in this regard does it make any substantial difference *in respect of separation that at the time when separation becomes important* the Westinghouse partition is *movable* and the Boyden partition is *fixed*.

Both devices equally and in substantially the same way—that is, by blocking, restricting or impeding the flow from auxiliary reservoir to brake cylinder, except through the restricted port 35 of the one or B of the other—secure the same results, and in the same way. We have shown, also, that the fact that a “partition” with a restricted port therein is *movable* rather than *fixed* is admitted by Mr. Boyden himself, in Patent No. 481,136, *to be an unsubstantial difference*, because he illustrates the invention of that patent in one form (Figs. 11 and 12) with a movable partition (9) substantially like Westinghouse's.

Fourth Point. Your petitioners, therefore, respectfully submit that the Court inadvertently erred in supposing, as it did, that *the location* of the Boyden partition 9 “*between the chambers D and C*” is a material difference, or a difference of substance—that is, as respects “*quick-action*.” No such contention was made in the oral arguments of defendant's counsel.

Defendants' position was this: That their valve 22 was *not* an “*auxiliary*” valve, but was *the main* valve; and, in support of *this* contention, they emphasized the location of their partition 9—that it was *so* located that it provided for the admission of *auxiliary*

reservoir air along with *train-pipe* air to the brake cylinder, and that as the admission of *auxiliary reservoir* air was in the old automatic brake a function of the *main valve*, therefore, this particular location of the partition 9 tended to make their valve 22 the "*main*" valve, and not an "*auxiliary*" valve. This, as we recall the argument, was the substance of their contention.

But the Court has found, in substance, as we read the opinion, that defendant's valve 22 is, in fact, an "*auxiliary*" valve, and a "quick-action" valve, notwithstanding the fact that, when it is opened in emergency use for the admission of *train-pipe* air, some auxiliary reservoir air—i. e., as much as can pass through the restricted port B—also passes through with it.

Hence, the Court having found, against the contention of defendants, that the location of the partition 9 does not have the effect of converting the valve 22 into a "*main*" valve, but leaves it still an "*auxiliary*" valve, it would seem to follow that the mere location of the partition 9 ceases to be a material fact in the case, especially in respect of quick action. Putting the partition 9 with its restricted port B between the chambers D and C, or putting it at any other point in the line of flow from auxiliary reservoir to brake cylinder, while to a limited, but insignificant, extent it may affect valve 22, does not in any manner, nor to any extent, affect the essential features of the structure, as they are combined to produce "quick action."

A similar argument holds also in reference to the "central passage" which defendants have provided through their triple-valve piston, as compared with the Westinghouse by-passage. Defendants relied on their central passage in support of their contention that their valve 22 was a "*main*" valve, and not an "*auxiliary*" valve.

The Court has found this fact against them.

Hence, it would seem to follow that, in *re quick action*, the difference between a *central* passage and a *by-passage* is not a difference of substance.

Careful attention to the purpose and mode of operation of the

separating partition and its small port will, we submit, show that the *location* of such "restricted port" is not substantial, provided only it be located somewhere in the line of flow of air from the auxiliary reservoir to brake cylinder, and at *any* point in such line of flow, where it accomplishes the following objects, viz. :

(a) Restricts the flow, so that the reservoir air will be at *high* pressure behind the triple-valve piston, to move it when train-pipe pressure is reduced ;

(b) Restricts the flows, so that such auxiliary reservoir air will *not* be at high pressure behind or under the check valve in the passage from train pipe.

(c) Admits reservoir air *slowly* as a supplement to train-pipe air.

These are the only purposes of the "restricted port," and they can all be as well accomplished in Westinghouse's location as in Boyden's, and *vice versa*.

Fifth Point. We submit, also, that the Court inadvertently erred in finding that Mr. Boyden,

"has made a more perfect brake than the one described in the Westinghouse Patent" (Opinion, p. 22).

This error was doubtless made through reliance on the statements of counsel at the argument ; for with a good knowledge of the contents of the record, and after a careful re-examination thereof, we are unable to recall or to find any testimony which can support such a finding. And so far as the proofs go, they are to the opposite effect.

Mr. Boyden is the only witness for the defense whose testimony even approaches the subject (Rec., pp. 515, 516, fol. 844) ; and he does not allege, nor even intimate, that his brake is any *better* than the Westinghouse. It is as certain as anything can be, that he would have said so, if he could. His silence certainly fails to support the finding of the Court.

Elsewhere in defendants' proofs, this matter is never referred to at all.

Nowhere does it appear that any considerable number of the Boyden brakes were ever actually sold, and still less does it appear that they were ever used, either successfully or otherwise.

Two of complainants' witnesses, Kidder and Nellis (Rec., pp. 425, 433), got together three cars (fol. 678) equipped with the Boyden brake, and tried them experimentally to see whether the Boyden valve 22, in actual use, had the operation of a *main* valve, or an *auxiliary* valve. They found it to be the latter.

Aside from this, the record contained no proof whatever as to the actual operativeness of the Boyden brake.

True, it worked on a short three-car train, but this proves nothing as to its efficiency *in emergencies on a long fifty-car train*. The old "automatic" without "quick-action," met all the requirements of use on short trains. It was only when *long* trains are to be handled that "quick-action" becomes an element of commanding importance.

The record is entirely silent as to the efficiency of the Boyden brake on a *long* train *in an emergency*. There is no proof whatever that it was ever so used or even tried. For aught that appears, if it had been subjected to the rigid tests and high requirements of the Burlington trials, its operation would have been found to be quite as defective for the practical requirements of quick action as that of the Westinghouse.

But as against any inferences favorable to the Boyden brake which may be drawn from the record we show by our testimony that the Boyden device is seriously defective in the proportioning of its ports and passages, and this testimony is not replied to.

Westinghouse, Rec., pages 296, 297, Q. 447.

If it is ever admissible to supply a paucity of record proof by reference to official reports of a governmental department, the present would seem to be such a case.

The Government of the United States publishes each year in its official reports of the Interstate Commerce Commission the number of railway cars then furnished with power brakes, as

reported to them by the railway companies, and the designating name of each.

We suppose that this Court may (at least in a matter not specifically contested on proofs) take notice of such "Public Documents" (*New York Indians vs. United States*, decided at this Term, April 11, 1898).

We collate from these reports the following tabular statement (with references to pages):

Report.	Boyden.	Westinghouse.
1890, page 36-----	86	144,085
1891, " 46-----	184	178,492
1892, " 28-----	282	245,276
1893, " 26-----	796	287,703
1894, " 26-----	1,690	315,729
1895, " 28-----	1,491	345,836
1896, " 28-----	439	428,805

The report for 1897 is not yet published.

These figures would seem to indicate that the Boyden brake has not recommended itself in practice, in view of the showing that the number of cars equipped with it has decreased from the maximum of 1,690 in 1894 to 439 in 1896—a falling off of over 70 per cent. in two years.

But, if the Court based its conclusion on the defective action of the apparatus of 360,070, when first tried at Burlington in 1887, then we may suggest in reply:

1. That such defective action arose largely from an improper proportioning of ports and passages, not of the valve itself, but of the "accessory parts" used in connection therewith, which defects, however, were corrected long before Boyden took up the subject at all, and thereafter this brake of 360,070 worked well.

Westinghouse, Rec., pp. 151, 152, fol. 228.

Westinghouse, Rec., p. 155, Qs. 190, 191.

2. Newly-invented apparatus, especially of a complicated character, rarely works perfectly on its first trial.

3. If the number of valves in use be adopted as a test of comparative merit between the Westinghouse and Boyden, then the Westinghouse valve of 360,070 is the "more perfect" valve.

Between *two and three thousand* of these very valves were sold to three leading Western roads and were still in use when the testimony was taken.

Westinghouse, Rec., pp. 305, 306, x-Q. 485, 486.

Also, about three or four hundred of these same valves of 360,070 were sold to the Baltimore and Ohio R. R. Co., and were used in passenger-train service for about two years, when the Westinghouse Company replaced them with their standard form of valve, No. 376,837.

Westinghouse, Rec., 304, 305, x-Q. 477-479.

Sixth Point. We respectfully submit, therefore, that an opportunity should be given for a rehearing upon the particular question whether the changed location of defendant's "auxiliary valve" and "partition" and "restricted port" is sufficient to avoid the charge of infringement.

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[11091]
[11093]

847 403 99 JAN 20 1896

Supreme Court of the United States

Filed Jan. 20, 1896.

IN THE MATTER OF THE PETITION

OF

GEORGE WESTINGHOUSE, Jr.,

AND

THE WESTINGHOUSE AIR BRAKE COMPANY

FOR A WRIT OF CERTIORARI.

BRIEF FOR BOYDEN BRAKE COMPANY.

CONTRA THE PETITION.

LYSANDER HILL,

EDGAR H. QANS,

Of Counsel for Boyden Brake Company.

Supreme Court of the United States

WESTINGHOUSE AIR BRAKE COMPANY,	}
<i>et al,</i>	
PETITION FOR A WRIT OF CERTIORARI.	}
VS.	
BOYDEN POWER BRAKE COMPANY,	
<i>et al.</i>	}

Sur Petition of the Westinghouse Air Brake Company, *et al*, for Writ of Certiorari to United States Court of Appeals for Fourth Circuit.

This is a petition for a Writ of Certiorari to bring Nos. 131 and 134, decided in the United States Court of Appeals for the Fourth Judicial Circuit, before the Supreme Court for its review and determination.

BRIEF IN OPPOSITION TO THE PETITION.

In this petition are twelve assignments of variance and error. An analysis of these assignments shows that they may be grouped into three classes.

1. Variances between the decision of the Court of Appeals for the Fourth Circuit and the decision of the Court of Appeals for the Second Circuit on the same subject matter. These are stated in assignment 1.

2. Variance between a ruling by the Court of Appeals for the Fourth Circuit and the decisions of the Supreme Court on the effect of the phrase "substantially as set forth." And variance with the Circuit Court of Appeals of the First Circuit on the effect of erasure from the original specifica-

tion. These variances are alleged in the fourth and fifth assignments. They really could be grouped with simple assignments of error, as the assignments *are more properly assignments of error* than assignments of variance.

3. Assignments of error. These are described in the third assignment, wherein error is alleged in the ruling of the Circuit Court of Appeals for the Fourth Circuit on the *weight of evidence* as connected with the practice of the Patent Office, and in the second, sixth, seventh, eighth, ninth, tenth, eleventh and twelfth assignments, wherein error is alleged in the rulings of the Court on matters of law and fact concerning the construction and validity of the patent in suit, and its infringement.

We have grouped the assignments into these three classes, because it seems manifest from the uniform decisions of this Court, as hereinafter pointed out, that the second and third classes just mentioned, furnish no ground for the application of the Writ of Certiorari, **AND THAT THE ONLY QUESTIONS TO BE REALLY CONSIDERED UPON THIS APPLICATION ARE THOSE ARISING UNDER THE FIRST CLASS OF ASSIGNMENTS, e. g.,** wherein variances are claimed to exist, as to subject-matter of the litigation, between the rulings of two appellate Courts whose decisions in patent cases are ordinarily final.

The brief for the petition discusses only the first five assignments.

GROUNDS FOR CERTIORARI UNDER THE ACT OF 1891.

This Court has described at length the class of cases which it will review by Writ of Certiorari, in several cases, to wit:

American Construction Co. vs. Jacksonville Railway Co., 148 U. S., 382.

Lau. Ow. Bew's Case, 141 U. S., 583 ; 144 U. S., 55.

In re Woods, 143 U. S., 202.

Columbus Watch Co. vs. Robbins, 148 U. S., 270.

From an examination of these cases the following principles may be deduced as governing all applications for certiorari of this character.

1. The object of the act was to relieve the Supreme Court of the overburden of cases, and to accomplish this to transfer a large part of its appellate jurisdiction to the Circuit Courts of Appeals.

2. The act is to be uniformly construed so as to promote this purpose, and especially in those classes of cases wherein, as in patent cases, the judgment of the Circuit Court of Appeals is, by this act, *made final*.

3. The power to bring up cases by certiorari is a branch of the jurisdiction of the Supreme Court "which should be exercised sparingly and with great caution, and only in cases of peculiar gravity and general importance, or in order to secure uniformity of decision."

Am. Construction Co. vs. Jacksonville Ry. Co.,
148 U. S. 382.

From this analysis it is apparent that a certiorari writ will not be granted unless the cause "is of peculiar gravity and general importance," or unless there is a substantial variance of decision on the *same* subject matter and under the same conditions. We will discuss this case under these headings.

(A.)—CASES OF PECULIAR GRAVITY AND GENERAL IMPORTANCE.

Independently of the questions of variance which we will discuss hereafter, there are no questions in this case different in any respect from those which usually arise in patent cases. There is no unusual, extraordinary or fundamental question, even on patent law, involved in any of the assignments of error. None of these can, by any possibility, be brought within the meaning and scope of the phrase, "cases of peculiar gravity and general importance."

What did this Court mean when they declared that in "cases of peculiar gravity and general importance" they would review a case by certiorari, even though otherwise made final by the Act of 1891?

Evidently the gravity and importance of the case is to be found in the *nature* of the question, and not in the mere

sum of money involved, or in the extensive use of the invention. If it had been the intention of the Act to give a hearing in the Supreme Court to such patent causes as involved large sums of money, such intention would have been expressed and the amount fixed. But by the Act all patent causes are finally decided in the Circuit Courts of Appeal. Nor can a patent which is used in every State in the Union have any right to a hearing in the Supreme Court which is denied to a patent with less extensive use. No such discrimination would be practicable. A patent of limited use to-day might be in universal use next year.

An examination of all the cases shows that in the entire history of this Court since the Act of 1891 was passed, *not a single application for a certiorari in a patent case has been granted*, when the only questions involved were such as usually arise in patent cases, and such as arise in this case.

In the following cases the writ was denied:

Sawyer Man Co. vs. Edison Electric Co., 11 U. S. A., 712; 149 U. S., 785.

This case involved the Edison incandescent electric lamp, which is in extensive use.

Stewart vs. Smith, 17 U. S. A., 217; 154 U. S., 519.
Case of design patent.

Singer Sewing Machine Co., vs. Brill, 7 U. S. A., 601.
Sewing machine patent.

The David Bradley Mfg. Co. vs. The Eagle Mfg. Co., 18 U. S. A., 349; 154 U. S., 500.

Improvement in cultivators.

These were cases of valuable patents, several of them of *very extensive use through all judicial circuits*, involving the investment of large sums of money. But the application was denied in each case because no questions of "peculiar gravity or general importance" were involved.

It appears that in two patent cases only, since the Act of 1891, has this Court granted the writ of certiorari, and in these the special reasons for the Court's action are apparent.

In the case of Grosvenor vs. Dashiell, the patent involved was No. 425,584, granted to Samuel Seabury for improvement in breech-loading cannon. The bill stated an ordinary case involving questions of the validity and infringement of a patent, but alleged also that Dashiell, who was an officer of the United States Navy, was connected with the Bureau of Ordnance of the Navy Department, and that he conspired with Commodore Folger, who was in charge of the department, to use the complainant's invention and deprive the patentee and his assignees of the benefits and royalties secured by the patent.

This case in the Circuit Court of Appeals for the Fourth Circuit did not turn on any question of patent law, but upon the very grave and important question as to the right of the government in its sovereign capacity to use a patented device in the manufacture of implements of warfare indispensable to the armament of its vessels of war, without being liable to be stopped by the patentee by injunction. As Circuit Court Judge Goff decided :

"We do not think that contending patentees, striving between themselves and those interested with them, as to the validity of their respective letters patent, should be permitted to close the arsenals, ordnance shops and navy-yards of the United States by injunctions issuing out of their litigation, thereby frustrating the designs of the government, rendering inoperative the legislation of Congress germane thereto, and causing great loss of the public funds appropriated by Congress in execution of the same."

Hence, it will be perceived that though this question arose in a patent case, it was not a question of patent law at all, but was an important governmental question, in which the United States was vitally interested.

The only other case in which a patent was involved, and in which a certiorari was granted, is the case of Vulcan Iron Works vs. Samuel R. Smith et al.

In this case the question involved was the *jurisdiction* of the Circuit Court of Appeals. On the question of juris-

diction, the decisions of the Circuit Court of Appeals of various circuits were at variance; and this variance was vital to the rights of the petitioners, for it appeared that if the case had been decided in one circuit the decree would have been affirmed; but as it was decided in the other, the decree was reversed.

This case presented two vital and important questions: First, the jurisdiction of the Circuit Court of Appeals; and second, an absolute variance between the circuits on this jurisdictional question; and upon the decision of these questions the rights of the petitioners in the case depended. Neither of these questions are mere questions involving patent law.

What extraordinary or unusual question "of peculiar gravity and general importance" is presented by the record in the *present* case? There is no governmental question; no question of jurisdiction; no issue in which any one is especially interested except the parties litigant. If the writ of certiorari should be granted in this case, on the ground we are now discussing—peculiar gravity—it would be an innovation upon the established practice of this Court, and no good reason can be perceived why like writs should not issue in any subsequent cause at the instance of any litigant who felt that his patent had not been properly construed by the Circuit Court of Appeals.

If the shoe were on the other foot, and we had secured an injunction against the Westinghouse Company, and this injunction had the practical result of obstructing interstate traffic, or the carrying of the mails with safety, then, indeed, an unusual question would arise which might call the discretionary power of this Court into action.

But the only practical question in dispute in this case was whether the Westinghouse Company should have the sole monopoly in supplying the railroad companies with "quick-action automatic air-brakes," or whether the Boyden Company should have the right to supply their own special contrivance in competition. This is, therefore, a mere *private litigation* embracing no question of "peculiar

gravity or general importance ;" and on this ground, unless there is something in the question of variance, the application for the writ of certiorari should be denied.

(B).—VARIANCE.

The petitioners, however, rest their case mainly on the ground of an alleged variance between the decisions of the Circuit Court of Appeals for the Fourth Circuit and the Circuit Court of Appeals for the Second Circuit on the same subject matter—to wit, Claim 2 of Patent 360,070.

In their petition they cite four decisions in the Circuit Court and the Circuit Court of Appeals of the Second Circuit, as follows :

Circuit Court, Judge Townsend, 59 Fed. Rep., 581.

Circuit Court of Appeals, Judge Shipman, 63 Fed. Rep., 962.

Circuit Court, Judge Lacombe, 65 Fed. Rep., 99.

Circuit Court of Appeals, per curiam, 69 Fed. Rep., 615.

Petition, pp. 3-4, par. 8-12.

The patent here in controversy, 360,070, was not in issue in the first two decisions.

The variance alleged in the petition and relied upon in the brief of complainants, is between the decision of Judge Lacombe, as affirmed, per curiam, in the Second Circuit and a decision of the Circuit Court of Appeals for the Fourth Circuit.

In their brief the petitioners argue that a certiorari should be granted under the Act of 1891 :

(1). In cases of variance between decisions of the Circuit Court of Appeal of different circuits in adjudications upon the same patent.

(2). When the patent involves rights of sufficient importance to justify the intervention of the Supreme Court.

The importance of the invention embraced in patent 360,070 is described in their brief, pages 2-7; here it is made to appear that the patent in suit is one of great

importance and "value in promoting the public interest," and in answer to the averment in the petition on page 6, to the effect that the *device of the patent in suit is in use on 400,000 freight cars*; it should be stated that the testimony shows the device of this Patent No. 360,070 is not in use and has not been made since 1887. On this point the testimony of H. H. Westinghouse the General Manager of the Westinghouse Air-Brake Company is conclusive; see Transcript of Record, page 224.

"165 X-Q. Does the Westinghouse Catalogue 1890, "the one now in use, contain any plates or illustrations of 'quick action triple valves' like that shown in the drawings of the Letters Patent No. 360,070?"

"A. It does not.

"166 X-Q. Please state whether or not the type or form of 'quick action triple valve,' which is shown in the drawings of the Patent No. 360,070 was ever illustrated in any catalogue issued by the Westinghouse Air-Brake Company?"

"A. I believe it was not.

"167 X-Q. Is the Westinghouse Air-Brake Company now making and selling 'quick action triple valves' of the type or form shown in the drawings of the Letters Patent No. 360,070?"

"A. They are not."

This device is not in use now, and was abandoned after the trials at Burlington, Iowa, in 1887, because it was *practically unsuccessful*.

The device which *is* in extensive use is the one covered by *another* Patent, No. 376,837, not here in suit. We submit this disposes of the pretension that the patent in controversy is one of great importance and used on 400,000 cars.

The statement of petitioners as to the character of the variance which is ground for a certiorari, is found in the brief, pages 1, 2.

On page 1 of their brief they say:

"When Congress passed the Act of March 3, 1891, establishing Circuit Courts of Appeals, and

in patent cases, made their decisions final, it was anticipated that sooner or later conflicting and irreconcilable decisions would or might be rendered. And obviously, as the effect of such conflicts, a patent valid in one circuit might be invalid in another circuit; and an act of infringement, if committed in one circuit, would be enjoined as wrong, and if persisted in, would be punished as a contempt of court; while in another circuit the same act would be held to be perfectly careful, proper and innocent."

And the petitioners state the alleged variance in their brief, pages 7, 8, as follows:

"The Circuit Court of Appeals for the Fourth Circuit, in the opinion rendered by his Honor, Judge Hughes, says that this Claim 2 is invalid, or, to use the exact language employed, that it is 'fatally defective.'"

Petitioners brief, p. 7.

"This ruling is directly in conflict with a holding of the Circuit Court of Appeals for the Second Circuit. It was there held that this claim 2 of patent 360,070 was valid, and the action of the Court below in awarding an injunction under this claim was affirmed. And this injunction is still in force in the Second Circuit."

Petitioners' brief, p. 8.

From this statement of the alleged variance, the petitioners attempt to impress this Court with the idea that the adjudications of the Courts of the Second and Fourth Circuits on claim 2 of patent 360,070 are so conflicting that if a suit were brought against the Boyden Brake Company, et al, in the Second Circuit the defendants would be enjoined as infringers, whilst if the suit were brought against them in the Fourth Circuit, the bill would be dismissed. This is their contention, stated practically, though they do not use this precise language; *and they are obliged to make out a variance of this kind in order to have even a possible chance for procuring a certiorari.*

Because, if the variance is only formal and trivial and of such a character that no matter which decision is taken, the *result as to the defendants would be the same*, manifestly no such difference of adjudication would exist as would call for the intervention of this Court.

We respectfully insist that the petitioners' brief, in so far as it alleges a variance materially affecting the petitioners' rights against the defendants', is not candid, but is directly misleading.

This Court will find on examination that there is no real variance at all between the two Courts of Appeal, and that the *apparent* variance has nothing in the world to do with the petitioners' rights as involved in this suit.

This alleged variance, even if it exists, is purely formal and immaterial, and the absolute immateriality and triviality of the alleged variance can be demonstrated by an examination of the claims of the patent and a comparison of the decisions which are alleged to be at variance.

In order to better understand the subject matter to which the claims relate, the air-brake will be briefly explained.

MECHANISM OF THE AIR-BRAKE.

The automatic air-brake consists of a train-pipe extending along under the cars, an auxiliary reservoir, a brake-cylinder and a triple valve on each car; the triple valve governing the flow of air between the other devices. The patents on the foregoing devices expired several years ago, and they were public property at the time of filing the bill in this case. The "triple valve," which was old, is *colored blue* in the cuts at the end of this brief. In the year 1887, Westinghouse added to the old triple valve "*an auxiliary valve device*," and procured this patent, 360,070, for the same. This auxiliary valve device of 360,070 is *colored red* in the cut representing this patent at the end of this brief.

Claims 1, 2 and 4, of Patent 360,070, issued to George Westinghouse, Jr., were the special subjects of the suit.

Claim 1 reads:

"In a brake mechanism, the combination of a main air-pipe, an auxiliary reservoir, a brake-cylinder, a triple valve, and **AN AUXILIARY VALVE** device actuated by the piston of the triple valve and independent of the main valve thereof, for admitting air in the application of the brakes directly from the main pipe to the brake-cylinder, substantially as set forth."

In this claim only the part in bold type was new (colored *red* in cut); the triple valve parts of the combination were old (colored *blue* in cut).

It will be observed that the "*auxiliary valve device*" is the only new element, and that it admits the air from the main pipe to the brake-cylinder. The piston is old and merely actuates the "*auxiliary valve*," and is not the element that does the "*admitting*."

The Circuit Court (Judge Morris) and the Circuit Court of Appeals for the Fourth Circuit both decided this claim to be valid, but they also both decided that there was no infringement, as the defendant's mechanism did not contain an "*auxiliary valve device*," but that Boyden accomplished the same result by giving the *old* main valve of the old triple-valve a *double* function without using any "*auxiliary valve device*" whatever.

Claim 4 is substantially the same as Claim 1. As to these two claims the Circuit Court (Judge Morris) decided, and its decision was affirmed on appeal—

"As by the explicit terms of Claims 1 and 4, Westinghouse has restricted himself as to those claims to an *auxiliary valve* independent of the main valve, I hold that the defendant does not infringe those claims."

Both claims contained as part of the combination "*an auxiliary valve*," and this auxiliary valve was the new thing which made the combinations patentable. The complainant received, therefore, full protection from the Circuit Court of Appeals against any one using such brake

mechanism with an "*auxiliary valve*," but the Court decided, *as matter of fact*, that the device of the Boyden Company did *not* contain any "*auxiliary valve*," and therefore did not infringe the claims Nos. 1 and 4 of the Westinghouse Patent. No variance is alleged as to this part of the decision.

The alleged variance appertains to Claim 2, which reads :

"2. In a brake mechanism the combination of a main air-pipe, an auxiliary reservoir, a brake-cylinder and a triple-valve having a piston whose preliminary traverse admits air from the auxiliary reservoir to the brake-cylinder, and which, by a further traverse, *admits air directly from the main air-pipe to the brake-cylinder*, substantially as set forth."

All the parts or mechanism named in this claim, including the "further traverse," are old and are shown in blue in the illustrations; the part of the claim in *italics* is a mere *functional* recital or result, and is all that is new in the claim.

It will also be observed that the element, an "auxiliary valve," which is described in the specification as *necessary* to admit the air from the "main air-pipe to the brake-cylinder," is not included in terms in Claim 2 as it is in Claims 1 and 4.

Now, how did the Appellate Courts for the Fourth and Second Circuits respectively treat this claim?

The Court for the Fourth Circuit held this claim *in the form it has*, to be defective. They said:

"We think that when Claim 2 of 360,070, in its language describing the action of that device, fails to describe any means by which the extreme traverse of the piston produced it, declaring merely that the piston, '*by a further traverse, admits air directly from the main air-pipe to the brake-cylinder*,' it was fatally defective, claiming only a result which was public property and not identifying the specific means (his own property) by which the result is achieved."

The Court for the Second Circuit affirmed Judge Lacombe's opinion, *per curiam*.

Judge Lacombe construed this claim valid, not in the form in which the claim is expressed, but by reading into it the mechanical means, to wit: *the auxiliary valve device*.

In order to clearly understand Judge Lacombe on Claim 2, it is necessary to advert to his treatment of Claim 1. In regard to Claim 1 Judge Lacombe says:

"The means for actuating the auxiliary valve device is stated in the claim to be 'the piston of the triple-valve,' and the way in which it acts, as shown in the patent, is by direct impingement upon the stem of the auxiliary valve device."

A little further on in his opinion Judge Lacombe says as to Claim 2:

"The discussion of the first claim applies equally to this one. In the first claim actuation by the piston of the triple valve was made an element. In this claim (2) the inventor more *closely limits the mode of such actuation*. It is to be by a 'further traverse' of that piston."

The Court will remember that the first claim contained an "*auxiliary valve*" as an essential part of the patented combination—an auxiliary valve *actuated by the piston*. Judge Lacombe, it will be seen, construes the second claim to be narrower than the first, in this, that whereas, Claim 1 contains an auxiliary valve actuated by the piston, Claim 2 contains an auxiliary valve actuated by "*the further traverse of that piston*." The decree in the New York case was for the complainant because the defendant in that case did use the "*auxiliary valve*."

Now we are in a position to see the *precise effect* of the alleged variance. What possible difference can it make *in the determination of this case* to the petitioners, whether, on the one hand, Claim 2 is declared "*fatally defective*" because it *fails to describe any means* and describes only the result, and thereby the patent fails to hold the defend-

ants, or, on the other hand, is declared valid by reason of *reading into* the claim an element these defendants do not use, an "auxiliary valve actuated by the further traverse of the piston," and thereby also fail to hold the defendants? Whichever view of this *alleged* variance is taken, the defendants, the Boyden Company, are not infringers. As the determination of *this case* would be the *same* under either ruling of Claim 2, there can be no *real* variance, and as the case stands justice has been done.

If Claim 2 is declared "fatally defective," Claim 1 still stands, and if it is declared valid by reading in "an auxiliary valve actuated by the further traverse of the piston," the claim "is more limited" than Claim 1, as held by Judge Lacombe. In Claim 1 the petitioners have more than in Claim 2, even as construed by the Circuit Court of Appeals for the Second Circuit. How are the petitioners hurt by the alleged variance?

By the construction held in the Second Circuit Claim 2 contains an "auxiliary valve." There was not the slightest contention in that case that Claim 2 did not contain an auxiliary valve. On the contrary, since defendants' infringing device (the New York Company) *in that case* did contain an auxiliary valve, there was every reason to *read* an auxiliary valve into the complainant's claim, as was done by that Court.

Counsel for the Boyden Company were perfectly willing to have, and indeed asked, the Circuit Court of Appeals for the Fourth Circuit to adopt the construction of this Claim 2 that was put upon it by the Circuit Court of Appeals for the Second Circuit. (Judge Lacombe's opinion.) We quote from the stenographic report of the oral argument of Mr. Hector T. Fenton, counsel for the Boyden Company, addressed to the Circuit Court of Appeals of the Fourth Circuit, as follows:

"Before discussing the law applicable to functional claims, I shall precede that by a reference to that part of Judge Lacombe's decision in which he discusses this second claim, to see how he treats

its peculiar language, and what mechanism, if any, he reads into it by implication, to make it a claim for a mechanism and not a claim for a mere function. *If your Honors will now apply to this same patent and to this same claim No. 2 precisely the same construction and interpretation that Judge Lacombe gave to it in that case, we shall be perfectly satisfied."*

Surely a "variance" cannot be material to the issue of infringement where counsel for the defendant, the Boyden Company, is willing for the Court to adopt either view!

Now, since it has been decided that as matter of fact the Boyden Company's device did *not* contain an auxiliary valve it was perfectly immaterial for them and to the decision of the case, whether Claim 2 was declared invalid, as the petitioners contend was done by Circuit Court of Appeals for the Fourth Circuit, or valid where an "*auxiliary valve*" is included, as defined by the Circuit Court of Appeals for the Second Circuit. **In either case the decision must be for the defendant.** And yet the petitioners seriously press this alleged "variance" as a ground for invoking the extraordinary and unusual jurisdiction of the Supreme Court of the United States.

In truth, the attempt of the petitioners is simply to get before the Supreme Court by this transparent device, so as to have this Court put on Claim 2 a broad, general construction, to aid them in their future litigation. This Court does not, however, decide *moot* cases, and would not decide on any proposition which does not substantially affect the rights of the parties to the controversy. *Bartemeyer vs. State of Iowa*, 18 Wall., 129.

To show more fully that there is no variance, it must be added that these cases from the Second Circuit were pressed upon the Court for the Fourth Circuit, but that Court decided that this case did not involve the same question.

On this very point at the last part of the opinion the Court for the Fourth Circuit says:

"Here it is contended that the mere use of the extreme traverse of the triple-valve piston to effect the same *functional* result, which was effected by Westinghouse in 360,070 constitutes an infringement, irrespective of the additional means employed. There it was ruled that the use of the extreme traverse *and* of an additional machine the auxiliary valve attached to the original 220,556, which was structurally and *mechanically* equivalent to 360,070 was an infringement of the letters patent. The cases are different and not on all fours with each other, and do not control or affect our own ruling."

As to the other cases in the Second Circuit, e. g., 59 Fed. Rep., 581, and 63 Fed. Rep., 962, *the Patent 360,070 was not in suit*. It is incidentally referred to in construing the subsequent patents of Westinghouse, which were in litigation. In these cases no construction is given to Claim 2 of this patent, nor is any construction given to any of the other claims at all at variance with the rulings of the Court in the Fourth Circuit.

The petitioners, in their brief, do not give the Court the real reason why the device of one defendant, in the Second Circuit, was adjudged to infringe, while the device of the other defendant, in the Fourth Circuit, was held not to infringe.

This result was not due to any conflict or contrariety of decision between the two Courts as to the proper interpretation of the claim, but was due solely to the fact *that the respective devices of the two defendants were totally different from each other*. The Boyden Brake Co.'s device does not contain the invention of the second or any other claim of the Westinghouse patent, as the said claims were defined by either the Court of Appeals of the Second or the Fourth

Circuit, as it does not contain an *auxiliary valve device*. This may be seen at a glance by looking at the illustrations at the end of this brief, in which the *auxiliary valve device* is colored *red* wherever it appears.

The device of the New York Air Brake Co., the Defendant in the Second Circuit, *did contain* the invention as so *defined in all the claims*, as it did have an auxiliary valve device. This may be seen at a glance by examining the illustration of this device, the auxiliary valve device being colored red. (See the cuts at end of brief.)

Hence, the alleged variance is *not* a conflict of decision as to a question of law or the construction of the claim, but a difference of finding of fact on the issue of infringement. In the Second Circuit the Westinghouse invention was compared with a device substantially identical with it, while in the Fourth Circuit it was compared with a device which was totally different from it.

This is not a case of the Circuit Court of Appeals for one circuit rendering a different judgment from that of the Circuit Court of another, *under the same conditions*, which is the test of a variance fixed by this Court.

Columbus Watch Co. vs. Robbins, 148 U. S., 270.

Besides all this, an attentive reading of the whole opinion of the Circuit Court of Appeals for the Fourth Circuit will show that it did not *adjudicate* that Claim 2 was invalid, but only that if *literally* construed it would be "fatally defective" as claiming only a result without specifying the means for attaining that result. This was said in answer to the general and extended construction put upon these literal terms by the lower Court.

In another part of the opinion, however, Judge Hughes is careful to state, speaking of all the claims:

"The phrase substantially set forth" is technical and is equivalent to saying, "by the means

described in the text of the inventor's application for letters patent, as illustrated by the drawings, diagrams and models which accompany the application. These words limit the general terms of the specification which set out the *function* performed by the invention and confine the inventor's rights to his own *means* or their mechanical equivalent of performing the function."

Therefore, the last vestige of this allegation even of a formal variance disappears.

The petitioners state in their brief:

"And the urgency of the case becomes the stronger in view of the fact stated in the "thirteenth" paragraph (p. 5) of the petition herein, that there are other causes involving this claim, unheard and undecided, and more particularly one in the Eastern District of Missouri."

Brief pp 8 and 9.

This statement of "urgency" is conclusive of the weakness of the petitioner's case, for it is perfectly manifest that in the pending Missouri case, if the defendant there has an "auxiliary valve device," he will be enjoined; if he has *no* "auxiliary valve device," the bill will be dismissed; and these results will be reached equally by the citation of the decision in the Fourth Circuit or that of the Second Circuit.

(C.) SECOND ASSIGNMENT OF ERROR.

The second assignment of error is discussed by the petitioners in their brief, pp. 10-14.

The error alleged is that the Circuit Court of Appeals for the Fourth Circuit decided that claim 2 of patent 360,970 was "fatally defective," whereas the decision of the Court for the Second Circuit was manifestly correct.

Brief, p. 10, p. 12.

Without further arguing the matter we simply suggest the following conclusive answers to this assignment:

1. The Circuit Court for the Fourth Circuit did not so adjudicate.

2. Even if they did so adjudicate and such decision is error, the errors would not be ground for reversal, for by such alleged error the complainants could not have been prejudiced, as we have already fully argued. The petitioners concede that the decision in the Second Circuit is right, (brief-6-12) and we have shown that there is no material difference between this decision and that rendered in the Fourth Circuit, so far as the Complainants rights against these Defendants are concerned.

Lancaster vs. Collins, 115 U. S. 222.

3. *A fortiori*, this error, even if it exists, would not, in the absence of the *right* of appeal be any ground for certiorari.

This question is fully discussed in the first part of this brief. We call the Court's attention in passing to the inconsistency of the petitioner's own argument. On page 12 of the brief the petitioners concede that the decision of the Court in the Second Circuit was correct. That Court declared claim 2 of 360,970 to be valid, by reading into its general terms "*an auxiliary valve*." And yet on page 11 of this brief the petitioners endeavor to read into this claim 2, not "*an auxiliary valve*" as did the Court for the Second Circuit, but a "*suitable valve*," which is directly at variance with the decision in the Second Circuit.

It is interesting to note in this connection that the patent office "File Wrapper" of the patent in suit contains an explanatory letter written by the Attorney when asking for the allowance of claim 2, after it had been rejected by the official Examiner of the Patent Office. In this letter urging that the claim be allowed the Attorney interprets the meaning of claim 2 as follows:

"When, however, the triple-valve is provided with an '*auxiliary valve*' operated by its piston, which performs a new function additional to that of the triple-valve as previously employed, it is believed that *such* combination is wholly novel."

Record, p. 1175, top of page.

(D) THIRD ASSIGNMENT OF ERROR.

This assignment is discussed in petitioner's brief from page 14 to page 22.

In substance, the alleged error consists in this—that the Court in considering the fact that the Patent Office, after full examination, awarded a patent to Boyden on August 16, 1892, decided "that action by the Patent Office was, in effect, a ruling that the Boyden device did not infringe patent 360,070," and takes rank as the testimony of experts of the highest experience, skill and knowledge of mechanics.

Without following the Complainants through the long argument by which they endeavor to show that this ruling was erroneous, we suggest the following answers to this assignment:

1. The petitioners seem to forget that they are discussing a case of application for Certiorari, and argue the matter as if they were before this Court on appeal as a matter of right. Even if we should concede that this alleged ruling of the Court was an error, which we do not, it would not furnish any *ground* for Certiorari, as we have fully argued in the first part of this brief.

2. Suppose the petitioners were before this Court on appeal *as of right*, this alleged error would not be even a ground for reversal. It forms simply a part of the *reasoning* of the Court of a corroborative character, and the *reasonings* of a Court are no part of its rulings and are not the subject of appeal.

Bell vs. State, 57 Maryland, 116.

The ruling of the Court for the Fourth Circuit on this question is found in the following language of its decision:

"Comparing the two devices apart from the triple-valve piston in extreme traverse, we are unable to entertain a doubt that the ruling of the Patent Office was correct to the effect that Boyden's device was *not the mechanical equivalent* of that of Westinghouse. They seem to us to differ as widely from each other as two devices for accomplishing the same result can well differ."

The Court will observe that this ruling that Boyden's device was *not* the mechanical equivalent of the device of Westinghouse is reached by the Circuit Court of Appeals from a *comparison* of the two devices. That is their conclusion from the comparison. The ruling of the Patent Office is referred to simply as corroborating their opinion. It is evident that such would have been their opinion entirely independent of what the Patent Office did. Whether their reference, *arguendo*, to the effect of the Patent Office ruling, in this case, be right or wrong, the question, so far as the rights of the Complainants and the Defendants are concerned, becomes a mere *abstract* question. It may be important to decide these abstract questions of practice, in the workings of the Patent Office; but they cannot be made the ground for an appeal, and a *fortiori* not a ground for *certiorari* in an actual litigation, when the rights of the parties are not essentially involved in the proper decision of the question.

3. But the decision of the Court was right, though its language might have been a little more explicit. Ordinarily, in a proceeding for infringement, a later patent issued to the Defendant for the machine in question, is not admissible in evidence, on the ground that it is irrelevant to the issue made up in the pleadings, which is merely that of the validity of the patent in suit, and the similarity or dissimilarity of the Defendants' machine with that of the patent alleged to have been infringed thereby. The reason

is that a posterior patent could not justify an infringement of a prior one for the *same machine*. In this case the later patent and the ruling of the Patent Office were simply set up as corroboratory evidence that the Defendants' device, described and claimed in it, "*differs essentially*" quoad the part or improvement claimed in the prior patent from the machine of such prior patent. The Boyden patents and the quasi judicial finding of the Patent Office were used in corroboration to show that the device described and claimed in the later patents to the Defendants is *not the mechanical equivalent* for, or an improvement on, the device described and claimed in the earlier patent of Complainants, and that the devices of the two patents are distinct and different inventions, constructed and operating on different principles, though producing the same result.

This is the only use made by the Court of the Patent Office ruling, and in making this use of it the Court was undoubtedly right.

Miller vs. Eagle Co., 151 U. S., 186.

Corning vs. Burden, 15 How., 252.

Robinson on Patents, vol. 3, s. 1016:

(E) FOURTH AND FIFTH ASSIGNMENT.

These assignments require no special argument, as the reasons urged in this brief against the prior assignments apply with equal force to these assignments.

The Defendants, having fully answered all the various assignments and reasons given by the petitioners for the writ of Certiorari, respectfully insist that the petition should be dismissed, with costs and the application for the writ denied.

EDGAR H. GANS,

LYSANDER HILL,

Of Counsel for the Boyden Brake Co.

No. 403 and 426

OCT 22 1896

Supreme Court of the United States.
Brief of Hill for Boyden Co.
Filed Oct. 22, 1896.

BOYDEN POWER BRAKE COMPANY.

GEORGE A. BOYDEN, President.
CHARLES B. MANN, Secretary.
WILLIAM WHITRIDGE, Treasurer.

AND

BOYDEN BRAKE COMPANY.

VS.

GEORGE WESTINGHOUSE, JR.

AND

THE WESTINGHOUSE AIR-BRAKE CO.

Appellants.

APPEAL.

Appellees.

GEORGE WESTINGHOUSE, JR.

AND

THE WESTINGHOUSE AIR-BRAKE CO.

VS.

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CHARLES B. MANN, Secretary.
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AND

BOYDEN BRAKE COMPANY.

Appellants.

CROSS-APPEAL.

Appellees.

**BRIEF OF ARGUMENT, FOR
BOYDEN BRAKE CO.**

LYSANDER HILL,

Of Counsel for the Boyden Brake Co.

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Supreme Court of the United States.

October Term, 1896. ⁴⁰³ Nos. 847 and ⁴²⁶ 878.

BOYDEN POWER BRAKE COMPANY,

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CROSS-APPEAL.

BRIEF FOR DEFENDANTS.

STATEMENT OF THE CASE.

This suit, for an injunction and account, was commenced December 12, 1889, in the Circuit Court for the District of Maryland, by George Westinghouse, Jr., and the Westinghouse Air-Brake Company, Complainants, against the Boyden Power Brake Company, George A. Boyden, President, Charles B. Mann, Secretary, William Whitridge, Treasurer, and the Boyden Brake Company, (the original company having been reorganized under

the latter name), Defendants, charging the Defendants with infringing the *first*, *second* and *fourth* claims of the patent issued to George Westinghouse, Jr., March 29, 1887, No. 360,070, for Improvements in Fluid-Pressure Automatic Brake Mechanism. Several years were spent in getting the case ready for trial, and finally it was argued before his Honor Judge Morris, at Baltimore, in November, 1894, and decided by him March 11, 1895 (66 Fed. Rep., 997.)

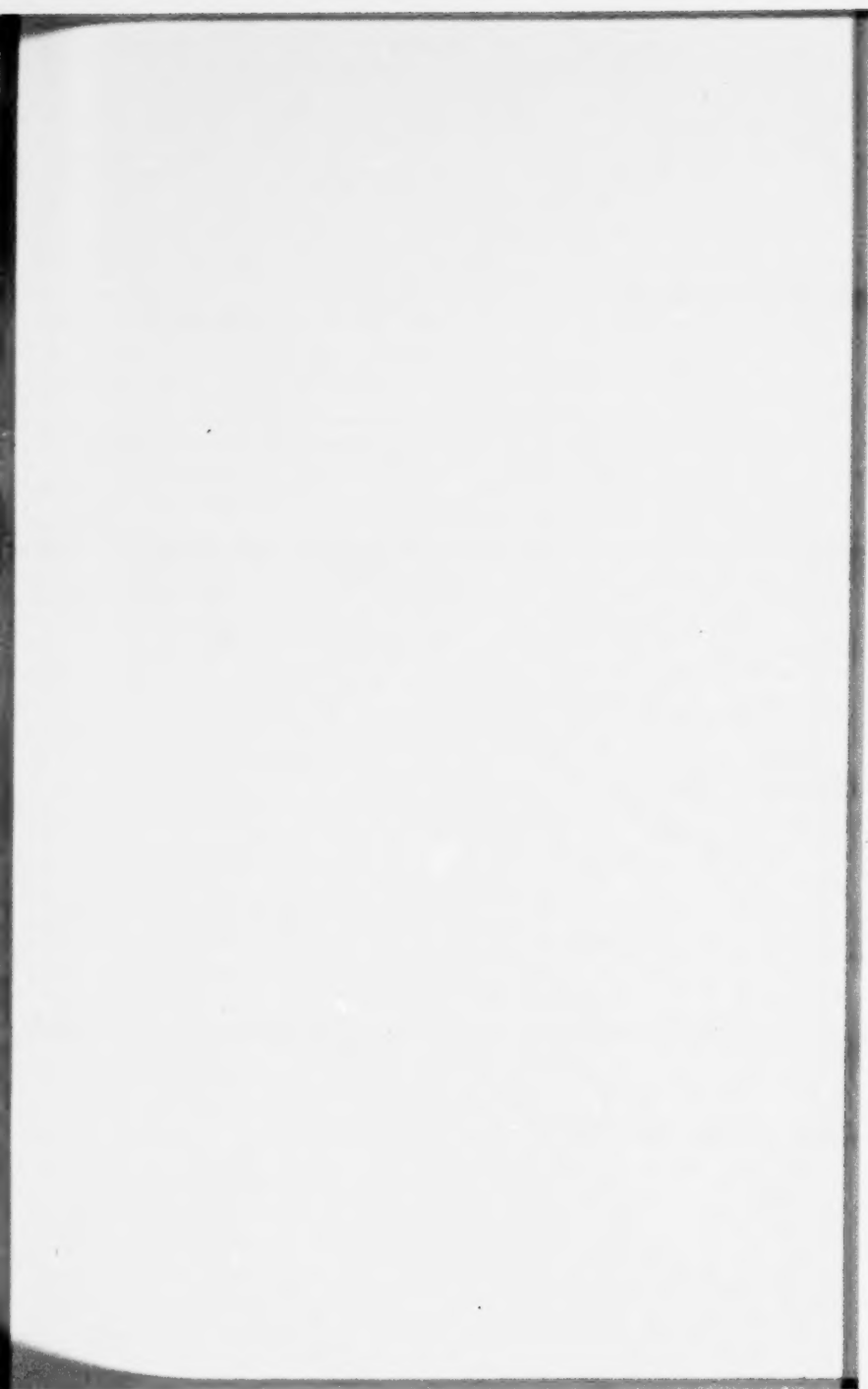
Judge Morris held, in substance, that the Boyden brake, the alleged infringing device, does not employ the "auxiliary" or "emergency" valve of the Westinghouse patent or any mechanical equivalent thereof, and, therefore, does not infringe the *first* and *fourth* claims, in which that element is expressly mentioned; but that the *second* claim of said patent, which is silent as to that element, is entitled to cover *functional equivalents*, or, in other words, *results*, and, in that view of the case that this claim was infringed.

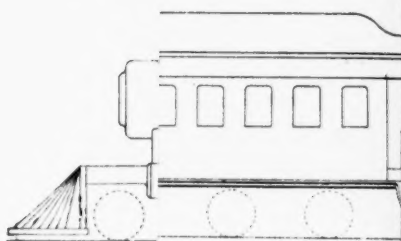
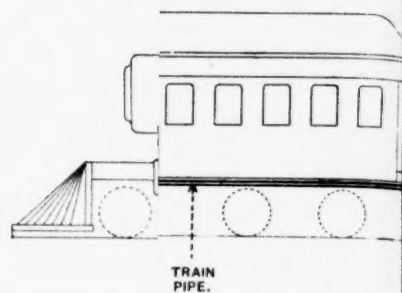
The Defendants appealed from so much of the decree as held them to have infringed the *second* claim; and the Complainants appealed from so much of the decree as held that the Defendants had not infringed the *first* and *fourth* claims.

On November 11, 1895, the United States Circuit Court of Appeals for the Fourth Circuit, sitting at Richmond, Va., rendered a decision (17 C. C. A., 430) affirming Judge Morris' decision on the *first* and *fourth* claims, but reversing it on the *second* claim, and directed the bill of complaint to be dismissed, which was done in obedience to its mandate. The Complainants then applied to this Court for a writ of *certiorari*, which was issued on January 30, 1896. Subsequently, on the petition of the Defendants, the case was advanced.

The only question to be determined is the question of infringement.

The invention in controversy consists in *mechanical means for producing a certain result which, in the air-brake art, is technically called "quick action."* The subject-matter of the patent in suit is comparatively simple, provided an intelligent understanding be first acquired of the air-brake mechanism as it existed prior to the date of said patent, March 29, 1887. We therefore, at this point, give a brief explanation of the development of the air-brake.





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BE FILMED

STATE OF THE ART.

DIRECT OR STRAIGHT AIR-BRAKES.

(See illustration.)

In the early forms of air-brakes the locomotive was provided with an air-pump, a reservoir, an engineer's brake-valve and pipe connections, and the cars were each provided with a pipe extending lengthwise (commonly called the "train-pipe,") which at each end of the car has flexible hose and couplings, and a brake-cylinder containing a piston and rod. The operation of the above elements was as follows:

The air-pump compressed the air, which was stored in the reservoir ready for use, the engineer's brake valve preventing it from passing to the train-pipe and brake-cylinder on the cars.

To apply the brakes the handle of the engineer's brake-valve was turned to permit the stored air in the reservoir to pass to the train-pipe and direct to the brake-cylinders on the cars, and exert its force on the pistons therein, which in turn transmit the power to the brake-shoes and press them against the wheels by suitable intervening levers and rods, and thereby apply the brakes.

To release the brakes the handle of the engineer's brake-valve was shifted to its former position, permitting the air in train-pipe and brake-cylinders to be discharged to the atmosphere, thus releasing the brake-shoes from the wheels.

The "straight air" brakes were seriously defective in practical operation, because, if the train-pipe or connecting hose became ruptured, or uncoupled, the brakes could not be applied, for the reason that, under these conditions, when compressed air from the reservoir was admitted to the train-pipe the said air would escape to the atmosphere, and would not therefore operate the brakes, or, if the brakes were already applied, they would instantly be released when such rupture occurred.

AUTOMATIC AIR-BRAKES.

(See illustration.)

To remedy the inherent defect referred to of the "straight air-brakes," a new system known as the "automatic air-brake" superseded the "straight air." In the automatic air-brake system the locomotive is provided with the same devices as

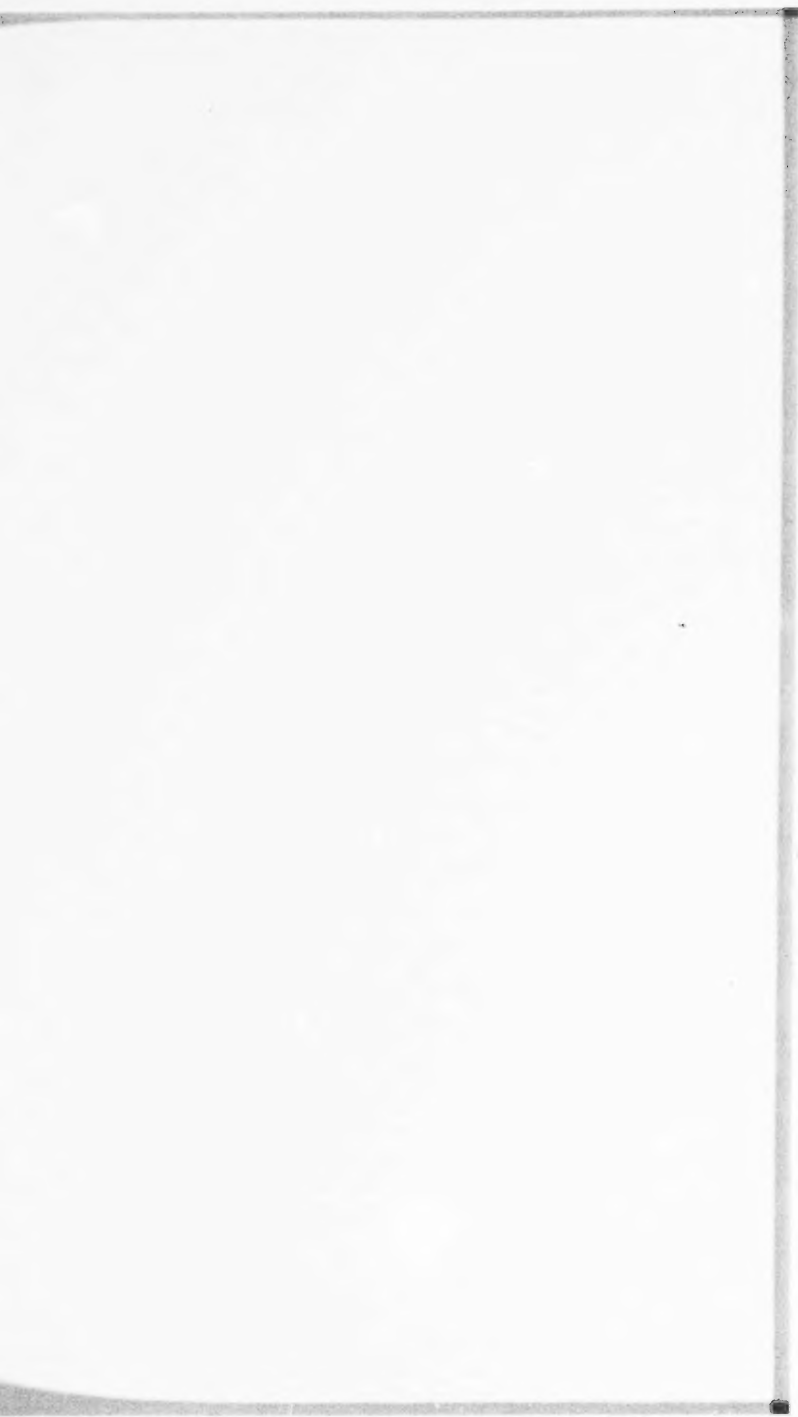
were used with the "straight air-brake," and in addition each car is provided with a storage reservoir (called the "auxiliary reservoir," because it is auxiliary or additional to the main reservoir on the locomotive) and with a *valve device* termed a "triple valve," arranged at the juncture of the train-pipe, the auxiliary-reservoir and brake-cylinder, its functions being to transmit the air-pressure to and from the above devices in applying and releasing the brakes.

The essential elements of an automatic air-brake are :

- | | | |
|---|---|--|
| 1. Air-pump, | } | These made up the
"straight" air-brake. |
| 2. <i>Main</i> reservoir on locomotive, | | |
| 3. Engineer's brake-valve, | | |
| 4. Train-pipe, | | |
| 5. Brake-cylinder, | } | These were added to
make the "automatic." |
| 6. Auxiliary-reservoir on car, | | |
| 7. Triple valve. | | |

The Mode of Operating the engineer's brake-valve to apply and release the automatic brakes is the reverse of that employed with the "straight air-brake," that is to say, when the "automatic brakes" are to be released, the engineer's brake-valve admits air to the train-pipe, which passes to and effects the triple-valve on the car so that the air from the train-pipe passes into the auxiliary-reservoir, and at the same time discharges the air in the brake-cylinder to the atmosphere to release the brakes, and when they are to be applied said brake-valve discharges the air from the train-pipe, which again effects the triple-valve, so that the air stored in the auxiliary-reservoir passes to the brake-cylinder.

By the Invention of the "Automatic" the serious objection of the straight air-brake was overcome, because, if the train-pipe of the automatic should rupture, or the hose-coupling become disconnected, and thus accidentally allow the air therein to escape, the compressed air in the auxiliary-reservoir would at once be *automatically* admitted to the brake-cylinder and apply the brakes in the same manner as though the air were intentionally discharged at the engineer's brake-valve—hence the term "automatic" was applied to this form of air-brake.

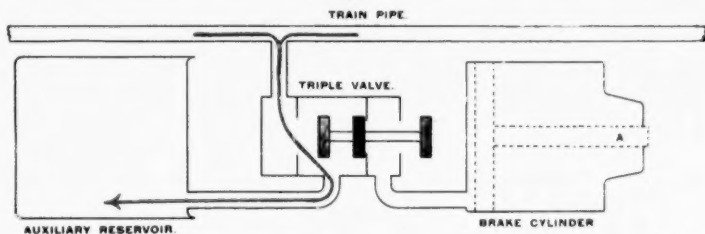


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Simple Form of Triple Valve.

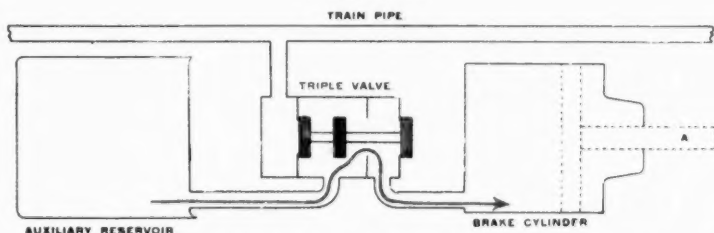
The diagrams below show the Train Pipe, the Auxiliary Reservoir, the Brake Cylinder and the Triple Valve of the "Automatic Brake" in a *simple* form in order to graphically define the philosophy involved.

Fig. 1.



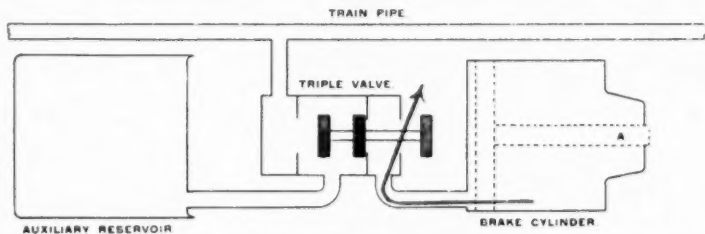
This cut shows the Triple Valve in the position to charge the Auxiliary Reservoir ready for use. The course of the air from the train pipe to the auxiliary reservoir is shown by the red line passing through the port of the feeding-in valve colored blue.

Fig. 2.



This cut shows the Triple Valve in the position to apply the brakes. The course of the air from the auxiliary reservoir to the brake cylinder is shown by the red line passing through the port of the main valve in solid black.

Fig. 3.



This cut shows the Triple Valve in the position to release the brakes. The course of the air from the brake cylinder to the atmosphere is shown by the red line passing through the port uncovered by the release valve colored green.

PHILOSOPHY OF THE TRIPLE-VALVE.

The functions of the triple-valve are, first, to charge the auxiliary-reservoir with compressed air from the train-pipe, and thus put the brakes in condition for use; second, to admit auxiliary-reservoir air to the brake-cylinder when it is desired to apply the brakes; and third, to discharge the compressed air from the brake-cylinder to the atmosphere when it is desired to release the brakes.

On the opposite page are inserted diagrams showing the train-pipe, auxiliary-reservoir, brake-cylinder and the triple-valve in a *simple* form in order to graphically define the philosophy involved, which is as follows:

To charge the brakes with air ready for use, the air from the train-pipe passes through the feeding-in-valve (colored *blue*) and thence to the auxiliary-reservoir where it is stored ready for use. The course of the air is shown by red line, Fig. 1.

To apply the brakes, the air is discharged from the train-pipe, and the expansion of air in the auxiliary-reservoir, causes the feeding-in-valve (colored *blue*) to close, and the main-valve (colored *solid black*) to open, which permits the air stored in the auxiliary-reservoir to pass through the main valve port to the brake-cylinder, and force out the piston rod, *A*, and thereby apply the brakes. The course of the air is shown by red line, Fig. 2.

To release the brakes, the air is again admitted from the train-pipe which causes the release-valve (colored *green*) to open and discharge the air from the brake-cylinder to the atmosphere, thereby releasing the brakes. The course of the air is shown by the red line, Fig. 3.

It will be seen that there are three functions involved in the operation of the triple-valve, hence the term "triple-valve," as used in connection with the automatic air-brake.

TRIPLE-VALVE OF PATENT 220,556.

"The triple-valve," as exemplified in the Westinghouse patent No. 220,556, October 14, 1879, and, in that form extensively used since, should be thoroughly understood before entering upon a discussion of the matters in controversy in the present suit.

The casing of the triple-valve (see cuts opposite the following page) is provided with a connection to the train-pipe, one to the auxiliary-reservoir and one to the brake-cylinder. The valves of this device are as follows:

First. The feeding-in valve, formed by part of the piston *G* (colored blue), whose *function* is to open a port *a* to admit compressed air from the train-pipe to charge the auxiliary-reservoir ready for use.

Second. The sensitive graduating-valve *e*¹ (colored yellow), whose *function* is to govern a port in the main valve *H* to admit auxiliary-reservoir air to the brake-cylinder in graduated amounts to partially or slowly apply the brakes.

Third. The release-valve *s* (colored green), whose *function* is to open a port to discharge the compressed air from the brake-cylinder to the atmosphere to release the brakes.

Fourth. The main valve *H* (colored solid black), whose *function* is to fully open a port *C* to admit auxiliary-reservoir air to the brake-cylinder quickly, in case it is desired to apply the brakes quick and stop the train *for an emergency*.

While four valves are embodied in this triple-valve 220,556, there are only three *functions*, because the *second* valve (yellow) and the *fourth* valve (black) perform the same *kind* of function, and differ only in the *degree* or manner of performance.

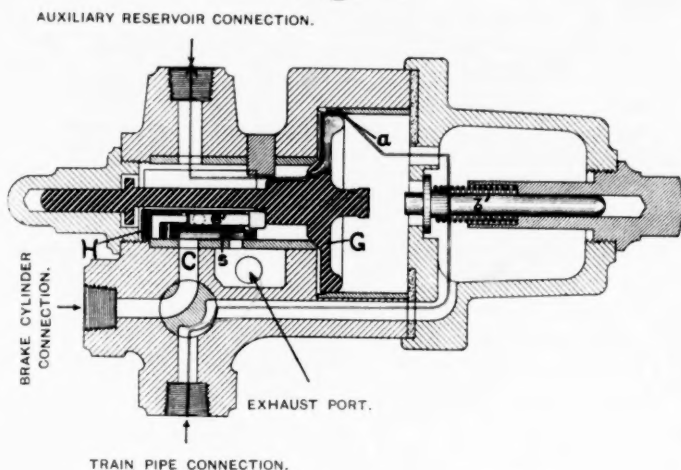
The piston *G* reciprocates in a cylinder, and *its function* is to *actuate* the several above-mentioned valves; the piston and its stem in the cut are etched with heavy lines to readily distinguish those parts from the casing, which are etched with lighter lines.

The operation of the "triple-valve" is as follows: To charge the brakes in readiness for use the engineer admits compressed air from the main reservoir on the locomotive to the train-pipe, the effect of which is to move the triple-valve piston *G* to the position shown in Fig. 1 (see cut opposite page), and thereby open the feeding-in-valve (*blue*). The air then passes from the train-pipe to the auxiliary-reservoir, its course being shown by the red line in Fig. 1. This reservoir is usually charged (as a maximum) with 70 pounds of air-pressure to the square inch.

To apply the brakes gently or by graduated application, in order to slack the speed of the train or to stop at a station, the engineer discharges a small amount of air from the train-pipe, which slightly lowers the pressure on the train-pipe side of the piston *G*, and the then higher pressure on the auxiliary-reservoir side causes the piston *G* to make its *preliminary traverse* which places it in the position shown in Fig. 2—against the abutting

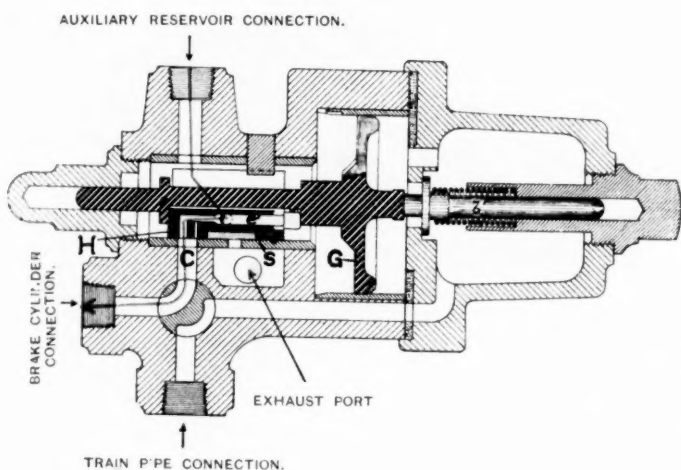
Triple Valve Device of Patent 220,556.

Fig. 1.



This cut shows the Valves and Piston **G** in the **Charging Position**, as used in 1. The course of the air in charging the Auxillary Reservoir is through the Port **a** shown by the Red line.

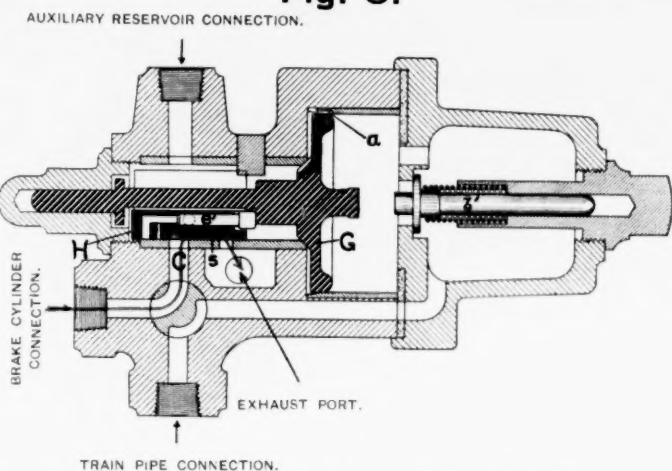
Fig. 2.



This cut shows the "**preliminary traverse**" of the Piston **G** and the Gradual Valve **a'** and Main Valve **H** in position for graduating and service stops, as used in 1. The course of the air from the Auxiliary Reservoir to the Brake Cylinder is through

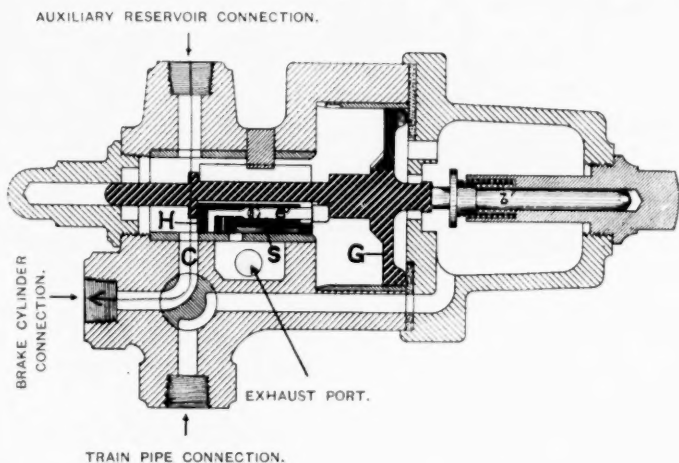
Triple Valve Device of Patent 220,556.

Fig. 3.



This cut shows the Valves and Piston **G** in the **Release Position**, as used in 1879. The course of the air is from the Brake Cylinder to the atmosphere through the Port **s**, shown by the Red line.

Fig. 4.



This cut shows the "further traverse" of the Piston **G** with the Main Valve **H** in position for an emergency stop. The Port **C** thereby being opened to its full capacity to admit air to the Brake Cylinder quickly, as used in 1879. The course of the air from the Auxiliary Reservoir to the Brake Cylinder is through the Port **C** opened by the Main Valve **H**, shown by the Red line.

stem b^1 , which arrests its movement. The function of this "preliminary traverse" of the piston is to close the release-valve (*green*) and open a port through the main valve H (*solid black*), which is governed by the sensitive graduating valve e^1 (*yellow*); this permits the auxiliary-reservoir air to pass to the brake-cylinder (the course of the air is shown by a red line, see Fig. 2), until the pressure in the auxiliary-reservoir is reduced below that existing in the train-pipe, the latter pressure, then preponderating, moves the piston back, which causes the graduating valve e^1 (*yellow*) to close the port through the main valve H (*solid black*), and thereby prevent any additional air from entering the brake-cylinder and holds the brakes partially applied. If an increase of braking pressure should be desired this graduating operation must be repeated.

To release the brakes the engineer re-establishes the maximum pressure (70 pounds) in the train-pipe, which moves the triple-valve piston G to the former position, and thereby opens the release-valve (*green*) so that the air will be discharged from the brake-cylinder to the atmosphere (the course of the air is shown by a red line in Fig. 3), and at the same time communication is established through the feeding-in-valve (*blue*) between the train-pipe and auxiliary-reservoir whereby the latter is recharged for future use. (See Fig. 1.)

To apply the brakes fully and as quickly as possible for an emergency in case of an accident, a greater amount of air is discharged by the engineer from the train-pipe than is required for merely partially applying or graduating the brakes. This *greater* reduction of pressure in the train-pipe causes the piston G of the triple-valve to make its full or *further traverse*, which forces the abutting stem b^1 to the right, as shown in Fig. 4. The function of this full or "*further traverse*" is to move the main-valve H (*solid black*) to fully open the port C to allow the auxiliary-reservoir air to quickly pass to the brake-cylinder and apply the brakes quickly (the course of the air being shown by a red line—Fig. 4) or in a briefer space of time than can be done through the graduating-valve e^1 (*yellow*) actuated by the *preliminary traverse* of the piston.

It is therefore seen that a "triple-valve," prior to the patent in suit, as exemplified in patent No. 220,556, dated October 14, 1879, consisted of four valves, namely, the feeding-in-valve (*blue*), the graduating-valve (*yellow*), the release-valve (*green*),

and the main-valve (*solid black*); and also it is seen that the said valves were actuated by a piston *G*, which had a preliminary traverse and a full or further traverse. It will also be noted that when *applying the brakes*, auxiliary-reservoir air may be admitted to the brake-cylinder by either one of two separate valves, to wit, the graduating-valve *e*¹, (*yellow*, see Fig. 2), for ordinary service work, or the main-valve *H* (*black*, see Fig. 4), for emergency work.

The form of triple-valve above described, and shown in the Westinghouse patent of October 14, 1879, No. 220,556, was the result of a series of improvements successively engrafted upon the original crude automatic air-brake patented by Mr. Westinghouse March 5, 1872, No. 124,404.

DEVELOPMENT OF THE TRIPLE-VALVE.

In his first improvement, patent August 12, 1873, No. 141,685 (p. 736), he invented the original form of triple-valve corresponding in principle to those which have since made the automatic air-brake successful and famous. In this original device, *the main valve*, which admits air from the auxiliary-reservoir to the brake-cylinder to apply the brakes, *was of the poppet form*, and, as a poppet-valve can govern only one port, separate valves had to be provided for feeding-in the air from the train-pipe to the auxiliary-reservoir, and for discharging the air from the brake-cylinder to release the brakes. The three separate valves constituting the triple-valve were actuated by a flexible diaphragm (the equivalent of a sliding piston.) The main valve was provided with a tapering plug, *a*, for graduating purposes, and was capable of admitting air rapidly or slowly from the auxiliary-reservoir to the brake-cylinder, according as the engineer caused the diaphragm (or piston) to be moved through its entire traverse or only through a portion of its traverse. This patent, therefore, contained the germ and principle of everything that is to be found in the later patent of October 14, 1879, No. 220,556.

In patent of October 28, 1873, No. 144,006 (p. 740), Mr. Westinghouse improved upon his prior devices by substituting a sliding piston for the flexible diaphragm, *by providing a check-valved air-passage through the piston for charging the auxiliary-reservoir*, and by making some changes in the form of the main

valve and the release valve, still, however, retaining *the poppet form of the main valve*.

May 11, 1875, C. H. Perkins, assignor to George Westinghouse, Jr., No. 163,242, and August 3, 1875, W. D. Jones, No. 166,386, (p. 745), and H. L. Perrine, No. 166,405 (p. 749), further improved the triple-valve by substituting a sliding piston-valve for the poppet form of main valve previously used by Mr. Westinghouse. This enabled a single sliding member to perform the feed-valve function of admitting air from the train-pipe to the auxiliary reservoir, the main-valve function of admitting air from the auxiliary-reservoir to the brake-cylinder to apply the brakes, and the release-valve function of discharging air from the brake-cylinder to release the brakes.

Mr. Westinghouse immediately saw the advantages of the slide-valve, and was quick to appropriate them to his own use by improving the form of its embodiment. He decided that a piston actuating a slide-valve was preferable to a piston-valve; and, October 5, 1875, took out an important patent, No. 168,359 (p. 752), covering this improvement. In the latter patent the piston itself (marked *G*), is made to operate as a feed-valve in connection with the small lateral passage *s*, while the main-valve function and release-valve function are lodged in a large slide-valve *H* held between two fixed collars on the piston stem and, therefore, moving with the piston. The piston is adapted to move through a portion of its traverse to partially open the main port *e* for graduating the brake-pressure, and through its entire traverse to fully open said port when necessary to apply the brakes with full pressure in the shortest possible time. The release of the brakes was effected through a recess in the face of the main-valve *H*, which, when the apparatus was in normal running position, connected the exhaust port, *e*¹ with the passage leading to the brake-cylinder. In the first part of its stroke to apply the brakes, the piston moved without opposition; but to complete its full traverse it had to overcome the resistance of a spring-controlled stem *d*¹; provided, as the patent states, "in order to render this operation of graduating the air-pressure in the brake cylinders more easy and certain," that is to say, in order to enable the end of the main-valve *H* with greater certainty to partially uncover the port *e* for graduating purposes, and to wholly uncover said port when sudden danger

or "emergency" required the quickest and strongest possible application of the brakes.

In patent of January 11, 1876, No. 172,064 (p. 752), Mr. Westinghouse reverted to the type of feed-port first found in his patent of October 28, 1873, No. 144,006 (p. 740), namely, by a passage *through* the triple-valve piston. He contrived a small stem or needle-valve, *c*, to govern said feed-port, and, by making the main-valve a little shorter than the distance between the two collars which actuate it, he gave the piston a slight degree of "lost motion" with respect to the main-valve, thereby enabling the needle-valve to close the feed-port without disturbing the main-valve.

Three years experience with the triple-valve as thus far perfected demonstrated that, while it was of great utility and value, it was not sufficiently *sensitive* to graduate as perfectly as was desirable. The reason of this was, that the large exhaust recess in the face of the main-valve caused the air-pressure behind the latter to press it strongly against its seat (see testy. of H. H. Westinghouse, p. 324, Ans. 550), so that considerable force was required to slide it, and that, after the brakes were set by graduation, if a force was applied sufficient to overcome the friction and slide the valve back far enough to close the passage to the brake-cylinder, in order to hold them set, it was liable to slide it clear to the inner end of its traverse, open the release-port, and thus accidentally release the brakes instead of holding them set. Mr. Westinghouse set himself at work to remedy this defect, and the result of his efforts appears in patent No. 220,556, dated October 14, 1879 (p. 762).

In this patent, he retained the "lost motion" of patent No. 172,064, and used it to operate a small sensitive graduating-valve *e*¹, working in a passage formed in the main-valve *H*, so that in graduating, the piston could cause the sensitive valve to open and close its port without disturbing the main-valve. This *sensitive graduating-valve* substantially perfected the Triple-Valve for ordinary passenger service, and has been used in one form or another, on all air-brakes since 1879. A complete description of its operation has already been given in this Brief on pp. 5, 6, 7 and 8.

TWO TRAVERSES OF THE PISTON—OLD.

In all the triple-valves above mentioned, the piston (or

diaphragm) was capable of a "preliminary" or partial traverse, for graduating purposes, and a "further" or complete traverse, for emergency purposes. By its partial traverse, the triple-valve partially opened the passage from the auxiliary-reservoir to the brake-cylinder and applied the brakes slowly; by its complete traverse, it opened said passage to its full capacity and applied them quickly with full force. The specification of patent No. 220,556 (p. 764, near the bottom) refers to the use of the partial traverse for graduating purposes, saying: "When now the valve *H* is thus shifted, so that the port *s*¹ shall, to the extent of one-quarter or one-half its capacity, more or less, *as is usual when less than a maximum breaking force is desired*, be thus brought into communication with the port *C*," etc., etc. The specification of patent 168,359 (p. 754, near the bottom) refers to the same subject in these words: "Hence the piston *G* may be brought down so that while entirely closing the supply-port *s* it shall bring the valve *H* to a position where it shall uncover only a small part of the port *e*, *or any desired part*." The specification of the original triple-valve patent No. 141,685 (August 12, 1873), indicated this operation as follows (p. 738, near the middle.):

"The area of the opening through the port *o*¹ is regulated *by the distance which the plug *o* is caused to move vertically upward*. * * * By the use of the "taper plug *o*, in the manner described, and by regulating, as can easily be done by the use of suitable cocks, "the amount of pressure in the upper and lower parts of "chamber *G*¹, it is easy to regulate the amount or density "of the air which is permitted to flow through the port "o¹ into the brake-cylinder, and consequently easy to "regulate and adjust, at all times, the force with which "the brakes are applied, *and such force may be varied "from the maximum power of the brakes down to the "fractional part of a pound in excess of ordinary "atmospheric pressure*."

Mr. H. H. Westinghouse, testifying as to the triple-valves in use prior to 1886, said (p. 123, near bottom):

“And all the operations of supplying the auxiliary reservoir, admitting air to the brake-cylinder of limited pressure, and of discharging the air from the brake-cylinder for the purpose of release, are performed by a *partial* movement of the piston and valve mechanism of the triple valves. It is only for ‘emergency’ operations or quick stops that the *final and complete* movement of this piston and valve is required. This final movement is obtained by a rapid and considerable reduction of pressure in the train-pipe, as compared with what is required for ‘service operations.’”

In the statement of facts preceding its opinion in this case, the Circuit Court of Appeals said:

“In the Westinghouse automatic air-brake, as patented in No. 220,556, the ordinary work of braking was performed by a partial traverse of its chamber by the triple-valve piston, graduated, according to the purpose desired, at the will of the engineer; and emergency work was done by an extreme traverse of the piston to the end of its chamber. It may be observed that the automatic air-brake, patented as No. 220,556, which embraced all previous improvements, is now free to public use, the patent having expired and ceased to be confined to the exclusive use of its inventor.”

TRIPLE-VALVE DEFECTIVE ON LONG TRAINS.

The triple-valve, thus slowly evolved from the original form of patent No. 141,685, August 12, 1873, to the highly improved form of patent No. 220,556, October 14, 1879, and in the latter form used by the complainants without further material improvement till the year 1888, was satisfactory for short trains consisting of eight or ten cars or less, but on long trains consisting of forty or fifty cars or more, it was not only unsatisfactory, but absolutely impracticable; *and its impracticability resulted from the very fact that the piston had the two traverses* referred to by Mr. H. H. Westinghouse at the bottom of p. 123, namely, a partial traverse for graduating purposes, and a full traverse for emergency stops.

The defective operation of the brakes occurred *only when making emergency stops*—their operation in graduating being entirely satisfactory. The cause of the trouble was as follows :

In making an emergency stop, the engineer throws his controlling valve wide open, allowing the air to escape from the train-pipe at the engine with the utmost possible speed. A great reduction of air-pressure instantly takes place in the forward end of the train-pipe, and travels back like a wave towards the rear end of the train. As it reaches the triple-valve of the first car, it causes the piston and main valve to be forced through their entire traverse, thereby suddenly opening to its full capacity the port or passage leading from the auxiliary-reservoir to the brake-cylinder and almost instantly applying the brakes with full force. The result is, that the first car is suddenly checked in its speed before the wave of train-pipe pressure reduction has had time to reach the second car and set brakes thereon ; and the second car runs forward at full speed and bumps against the first car, whose speed has already been checked. The same thing takes place between the second car and the third, the third and the fourth, and so on throughout the train. In other words, the brakes would apply on the forward cars of the trains in an appreciable time before they applied on the rear cars, thus checking the forward end of the train to such an extent that the rear cars would run into them, causing serious results from the collision. (See testy. of H. B. Stone, p. 136, ans. 51.) The effect is about the same as striking a precipice. Oftentimes the rear cars have been completely demolished by such a collision.

In *graduating*, however, the train-pipe pressure is but slightly reduced ; the piston and main-valve execute only a partial traverse ; the port leading from the auxiliary-reservoir to the brake-cylinder is only partially and momentarily opened ; the air flows slowly in'to the brake-cylinder ; and before the brakes effectively check the first car they are already commencing to apply on the second car. Hence, no " shock " is produced, and the train quietly and smoothly reduces its speed or gradually comes to a full stop.

The Circuit Court of Appeals said (p. 879) :

" That machine, 220,556, was designed both for graduated braking and for emergency braking. The former

“was provided in the sensitive valve inserted in the stem
 “of the triple-valve piston, through which compressed
 “air was vented at the will of the engineer from the
 “auxiliary-reservoir into the brake-cylinder. But this
 “earlier and expired patent contained more than the
 “sensitive valve in the stem of the piston, and more
 “room in the piston chamber than was necessary for a
 “partial traverse of the piston. It contained a main
 “valve and a sufficient prolongation of the piston cham-
 “ber for the extreme traverse. This main-valve and this
 “prolongation of the chamber were entirely useless for
 “graduated work, and were intended and employable
 “only for emergency work.”

The triple-valve of patent 220,556 and its predecessors were, therefore, well adapted for short trains, but for long freight trains they were practically useless; and in air-brakes used on *freight trains*, Mr. Westinghouse was obliged to omit the emergency port and abandon the attempt to make quick emergency stops (see testy. of H. H. Westinghouse, p. 142, Ans. 133.) With the emergency port thus omitted, a large reduction of train-pipe pressure holds the graduating port open long enough to gradually charge the brake-cylinder with full pressure, but so slowly that the train, if moving swiftly, necessarily must run a considerable distance before stopping.

This was a serious defect in freight brakes. The power to make a quick emergency stop is of extreme importance to the safety of life and property. The question, therefore, arose: “How can both the graduating function and the emergency stop of patent 220,556 be retained and used, and yet the emergency stop be effected without producing fearful shock?” This was the problem to be solved.

INVENTION OF MEANS TO QUICKEN THE APPLICATION OF BRAKES.

It was known that the “shock” was occasioned by the interval between the sudden application of the brakes on successive cars, and that if this interval could be shortened so that the brakes would begin to set on the second car before they had checked the first car, there would be no shock. A French engineer had discovered and demonstrated that if all the

triple-valves along the train be operated simultaneously, by means of an electric current controlled by the engineer, no shock is produced even in the most sudden emergency stop. The use of electricity for the purpose was objectionable, and it became desirable, therefore, that other means should be discovered for reducing the intervals occurring in the serial application of the brakes. Mr. Westinghouse turned his attention to this subject as early as 1879, and then conceived the idea that if the engineer could vent the train-pipe not only at the locomotive but *also under each car*, the serial application of the brakes could be greatly quickened, because the train-pipe air would escape at the *nearest* opening, instead of traveling to the locomotive, and thus the reduction of train-pipe pressure from one end of the train to the other, would be greatly expedited. This idea he embodied in patent No. 217,838, dated July 22, 1879, wherein he set forth the principle in the following language :

"It sometimes happens with such brake apparatus, *especially in case of accident*, that material advance could be effected by having all the brakes of the train applied or brought into action *simultaneously, or as nearly so as possible*. To accomplish this it is only necessary to make provision for the *simultaneous opening of one or more ports in the air-conduit passages at points not remote from each auxiliary reservoir*. For this purpose I arrange at such various parts of the air-conduit or communicating pipes as may be desired, but by preference at the couplings, relief-valves of the kind shown in the drawings."

He did not put this invention into general use on the railroads ; but, during the taking of the evidence in this cause, the Defendants demonstrated by actual tests of 50 brakes that the apparatus of the 1879 patent accomplishes all that Mr. Westinghouse claimed for it, reducing the time of applying the brakes on the rear car from twelve seconds down to six.

June 26, 1883, George A. Boyden, one of the Defendants, took out a patent, No. 280,285, in which the triple-valve not only controlled the admission of air from the train-pipe to the auxiliary-reservoir and from the auxiliary-reservoir to the

brake-cylinder, but also contained a check-valved passage leading from the outer end of the triple-valve piston-chamber to the main-valve chamber, so that compressed air could be transmitted directly from the train-pipe to said valve-chamber, and thence to the brake-cylinder, to augment the pressure of the brakes.

Such was the state of the art at the date of the invention in controversy in 1886.

GENESIS OF THE WESTINGHOUSE QUICK-ACTION AIR-BRAKE.

In 1885 the Master Car Builders' Association, an organization composed of those having charge of the construction and maintenance of car equipment upon railroads in the United States and Canada, and also those engaged in the manufacture of cars for sale, appointed a committee to investigate the relative merits of several brakes that were represented by their owners as suitable for general use upon freight cars. (H. H. Westinghouse, p. 117, Ans. 47.) This led to a series of tests in July, 1886, in Burlington, Iowa, a second series of tests in May, 1887, at the same place; and a third test at the same place in the fall of 1887, followed by the exhibition of a train of cars by the Westinghouse Air-Brake Co. on various railroads in the United States during the same fall. A full history of the matter is given by Mr. H. H. Westinghouse, in his answer 47 (pp. 117-135), and by Mr. H. B. Stone, in his deposition (pp. 135-138). The history is briefly as follows:

The test of July, 1886, on trains composed of fifty cars, demonstrated that air-brakes *in which the valves are actuated by electricity* effect an emergency stop without "shock;" but that air-brakes of the type of patent No. 220,556, in which electricity was not employed, and in which it took an average of 12 seconds to apply the brakes on the rear car, produced destructive and dangerous shocks. The degree of shock was measured by an instrument called a slidometer, in which an indicator was, by the stopping of the train, caused to slide to a distance proportionate to the force of the shock. Shocks of 12 inches were sufficient to injure live stock and equipment; repeated shocks of from 12 to 20 inches were sufficient to start

the loads, at the rear end of the train, through the ends of the cars; a shock of 63 inches broke the train in two, and nine of the rear cars, although loaded with special care and the loads protected by timber, had their ends broken and bulged out, by the shifting of the loads, to such an extent that they were in a dangerous condition (p. 119). The committee reported in favor of the air-brake which had its valves actuated by electricity; but doubted the reliability of electricity for practical use, and recommended further investigation (pp. 126, 127). The result was, the second series of tests on 50-car trains, which commenced May 13, 1887.

The test of July, 1886, proved conclusively that the shocks, (which occurred only in emergency stops), were due solely to the fact that the interval of time was too long between the application of the brakes on the successive cars. After this test was over, Mr. Westinghouse set himself at work to see if he could shorten such interval without the aid of electricity. He reverted to the principle of providing an *additional* and special valve for the purpose of venting the train-pipe under each car to the atmosphere, as set forth in his patent of July 22, 1879, No. 217,838; but modified the embodiment there shown by providing that said valve should be operated by the piston of the triple-valve of patent No. 220,556 in the act of making its final or complete traverse for an emergency stop (p. 124). Subsequently, he further improved this quick-action device by providing that the *added special valve* should vent the air into a *check-valved by-passage* leading directly from the train-pipe to the brake-cylinder, so as to save and utilize the locally vented air instead of discharging it to the atmosphere. And, on March 29, 1887, he patented this improvement in the patent here in suit, No. 360,070.

THE DEVICE OF THE PATENT IN SUIT.

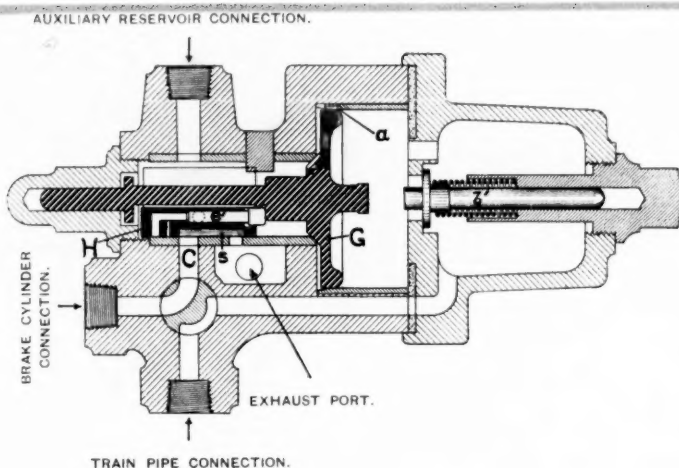
In this device Mr. Westinghouse took the old plain triple-valve of patent 220,556 as the foundation of the structure. The piston of that valve already had a *preliminary* or *partial* traverse for graduating purposes, and a *final* or *further* traverse for emergency stops. (See testy. of H. H. Westinghouse, p. 307, Ans. 488.)*

To this old structure, he *added* his new auxiliary-valve and its check-valved *by-passage*, and arranged them so that the new auxiliary-valve, designed only for emergency-stop purposes, should be brought into action by the *old further* or emergency traverse of the piston. The change thus made is clearly illustrated in the three cuts opposite this page, where the members added to the device of patent 220,556 to form the improved device of patent 360,070, are shown in *red*, the first of the three cuts representing the old triple-valve of patent 220,556, the second cut representing the entire new combination with the auxiliary-valve 41 seated and closing the by-passage 42, 43, 46, and the third cut representing the entire new combination with the auxiliary-valve 41 unseated, as in the act of making an emergency stop. The course of the air from the auxiliary-reservoir to the brake-cylinder, passing through the triple-valve, is shown by a yellow line, and the course of the air from the train-pipe, passing through the auxiliary-valve device to the brake-cylinder, is shown by a blue line. It will be noted that the course of the train-pipe air (blue) is wholly *independent* of the triple-valves. It is obvious at a glance that if the auxiliary-valve 41 were removed and the passage 42, 43, 46 plugged or closed, the structure of 360,070 would simply be reduced back to the old device of patent 220,556.

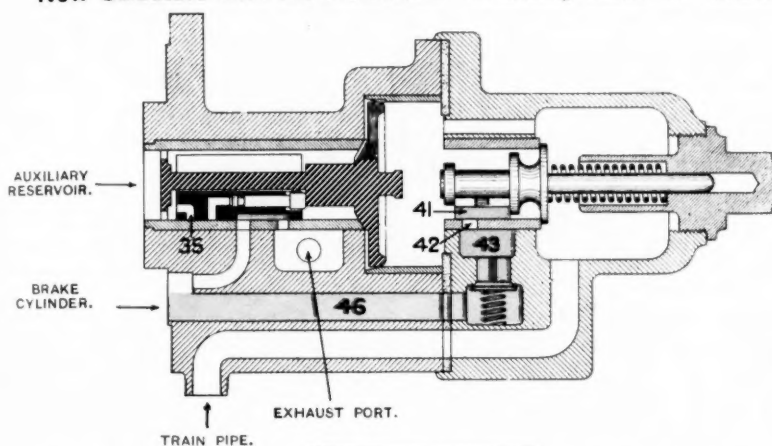
In graduating or making a service stop, the new structure operated precisely like the old—the piston, in such cases, not moving back far enough to unseat the auxiliary valve 41; but in making an emergency stop, the piston, executing its full

*“ In the construction, as shown in patent 220,556, the opening of the larger port from the auxiliary-reservoir to the brake cylinder under certain circumstances (emergency) requires that the traverse of the triple-valve piston and its valves shall be *considerably greater* than is required to make the less rapid (or graduated) application of the brakes, and this requirement of *further traverse* increases the length of all the principal portions of this structure fully twenty-five per cent.”

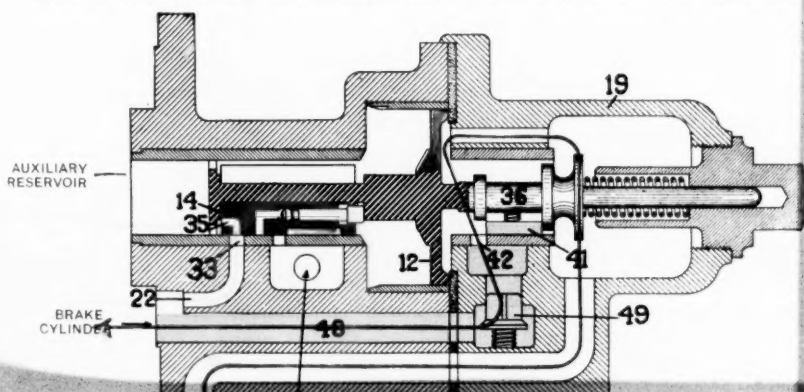
Testy. of H. H. WESTINGHOUSE, p. 307, Ans. 488.



New Structure with the Additional "Auxiliary Valve 41" Closed.



New Structure with the Additional "Auxiliary Valve 41" Opened.



FOLDOUTS TOO LARGE TO
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traverse, unseated the auxiliary valve and vented the train-pipe air directly through the by-passage into the brake-cylinder, thereby causing a more sudden reduction of pressure in the train-pipe than if said air had to travel to the locomotive, and hence, speeding the application of the brakes on the next succeeding car. To prevent the heavier pressure of the auxiliary-reservoir from entering the brake-cylinder too quickly, and by its back-pressure checking the vent from the train-pipe, Mr. Westinghouse restricted the main port of the main valve 14 by somewhat elongating the main valve and cutting a small port 35 through it to register with the passage 33 when making an emergency stop, instead of using a shorter main valve arranged to entirely uncover the passage C, as in patent 220,556.

In making an emergency stop with this apparatus, the unseating of the new auxiliary-valve 41 would suddenly vent from the train-pipe to brake-cylinder a pressure of about 25 pounds to the square inch (see specification of patent 360,070, p. 467, near bottom of page); and the air flowing from the auxiliary-reservoir to the brake-cylinder through the passage 35-33 (as at C in the old triple-valve, but somewhat more slowly by reason of the restricted main port 35) would then gradually raise the 25 pounds in the brake-cylinder to about 55 pounds.

THE NEW APPARATUS A PRACTICAL FAILURE.

With the apparatus of patent 360,070, which we have just described, Mr. Westinghouse appeared at the Master Car Builders' second Burlington test, commencing May 13, 1887, he having also appeared at the first test, in 1886, with a plain triple-valve; *but the apparatus of 360,070 was a complete failure, so far as concerns the prevention of shocks*, the sole object of its existence. It reduced the time of applying the brakes on the rear car to less than six seconds, but it did not shorten the time enough; and the result was, that *the shocks were increased instead of being diminished*, the slidometer showing a "shock" of 103 inches as compared with the maximum of 49 inches shown by the old automatic triple-valve at the first tests of July, 1886 (p. 126.)

"In fact," says *Mr. H. H. Westinghouse*, when testifying as to the shock produced by the device of patent in

suit (p. 126), "they were so severe that it was not *deemed* "prudent to use the brake in emergency applications "without the use of the electrical valves heretofore "described. When these were used, the desired coincidence of operation was secured and stops were made "without perceptible shock."

The Committee reported (p. 128) that:

"The brilliancy of the record was completely spoiled "by the fearful shock given at the rear end," and that " * * * in the electrical stops, the slidometer never "moved, and this with the same cars, the same leverages, "and the same pressures, the only difference being the "time of application."

Mr. H. H. Westinghouse testifies (p. 130) that:

"The conclusion of the 1887 trials (with the device of "patent 360,070), instead of furnishing to the railroads "the desired information upon which to take prompt and "reasonable action, served to show that much yet "remained to be done before it could be safe to make a "practical move in a matter of so great importance. "These sentiments were clearly expressed in the committee's conclusion from the 1887 trials."

The problem was still unsolved; and immediately after the close of the tests at Burlington in May, 1887, Mr. Westinghouse again went to work to effect its solution, which result he finally accomplished in the fall of 1887, *six months after the failure of the device of the patent here in suit, and by means of devices patented by him January 24, 1888, No. 376,837, which reduced the time of applying the brakes on the rear car down to two seconds.*

THE SUCCESSFUL DEVICE OF PATENT No. 376,837.

(NOT HERE IN SUIT.)

After the failure of the device of patent No. 360,070, in the Spring of 1887, the invention of the successful device of patent 376,837 was by no means obvious or easy, but required intense study and great inventive ability. *Mr. H. H. Westinghouse* (p. 131) testifies as follows :

"In obtaining this maximum result" (that is, evolving the successful device of patent 376,837) "the period of time "from the middle of May, immediately after the completion of the 1887 trials, until the first of October was "consumed. As may be imagined, the final result was "not obtained at once, but by repeated steps which required the complete refitting of the 50-car train not less "than three times. All the resources and employes that "could be used were kept at work day and night without "cessation, and the materials for trial, each time involving more than a car-load, was conveyed from Pittsburg "to Burlington by express, so that no time might be lost. "When, finally, in the latter part of September, 1887, the "last brake was applied in two seconds from the time of "the movement of the valve by the engineer, the source "of objectionable criticism that had heretofore existed "against the use of compressed air, unaided by electricity, "in the operation of power brakes upon long freight "trains, disappeared, and the "quick-action automatic" "brake, *as then constructed and organized*" (see patent 376,837, not in suit), "became, and has since been, the "standard power-brake apparatus for both freight and "passenger trains."

It will conduce to a better understanding of the character and limitations of the invention of patent 360,070, if we now examine the apparatus of patent No. 376,837 and observe the difference between the two devices.

In 376,837, the auxiliary-valve 41 is no longer immediately adjoining the piston so as to be actuated directly by the impact of the triple-valve piston, as in 360,070, but in the second patent is arranged opposite the main-valve chamber and actuated by a *supplementary piston*, 63, which supplementary piston, in its turn, is actuated by auxiliary-reservoir air admitted against its inner end by the extreme movement of the main-valve 14, in the act of making an emergency stop. The device is represented in the cut on the opposite page, in which the "auxiliary valve" and by-passage, the *additional members* of patent 360,070, are shown *in red*, and the still further additional members of a "supplemental piston" and piston-chamber, of patent 376,837, are shown *in brown*. The triple-valve is the *same* as that of patent No. 220,556, with an extra port uncovered by the main-valve to admit air from the auxiliary-reservoir against the supplementary piston 63, which actuates the "auxiliary-valve."

It therefore clearly appears that the points which are common to both patents—360,070 and 376,837—are as follows:

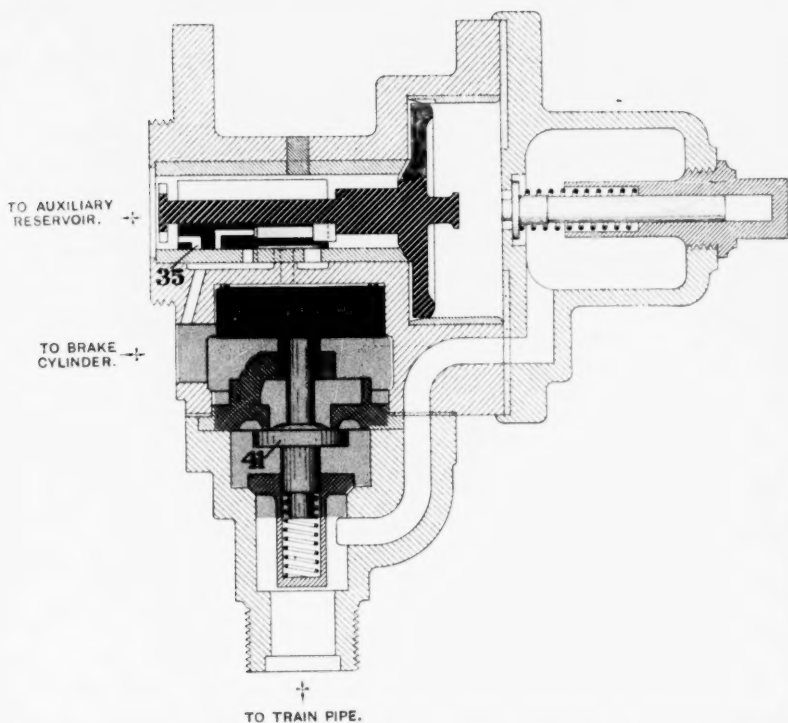
- 1, The old triple-valve parts of patent 220,556, which has expired;
- 2, A special by-passage leading directly from the train-pipe to the brake-cylinder;
- 3, A special "auxiliary-valve" to control said by-passage.

It also appears that the patent 376,837 differs from patent 360,070 by the former having:

- 1, An additional piston-chamber at the side of the triple-valve piston-chamber;
- 2, A "supplemental piston" arranged to be actuated by auxiliary-reservoir air;
- 3, And by actuating the "auxiliary-valve" by the "supplemental piston" instead of by the triple-valve piston, as in 360,070.

In other words, the invention of patent 376,837 consisted in combining the old triple-valve of patent 220,556, the new

Successful Device of the Later Patent, No. 376,837 of 1888.



The Triple Valve of this device is substantially the same as Patent 220,556, and 360,070. This device differs from Patent 360,070 here in suit and which was unsuccessful that the "Auxiliary Valve 41" is actuated by a supplemental piston instead of being actuated directly by the Triple Valve Piston.

The supplemental piston and its chamber are colored brown, and the "Auxiliary Valve 41," and by-passage of 360,070 are colored red.

auxiliary-valve and by-passage of patent 360,070, with a *supplemental piston* and piston-chamber as a motor apparatus for actuating said auxiliary-valve, thereby relieving the piston of the triple-valve from this *extra* work, and thus, as stated by Judge Townsend, in discussing these *two* patents in the New York air-brake suits, "his *later* 376,837 patent was the *bridge*, and not a step, which carried railroad car-builders from FAILURE to success."—(63 Fed. Rep., 969.)

WHAT IS 360,070 ENTITLED TO COVER?

In view of the foregoing facts, the question is, what invention was patent 360,070 entitled to cover? We answer:

It was *not* entitled to broadly cover the prevention of "shock" in long trains, because it did not prevent shock, for the test at Burlington showed it greatly increased it. It was *not* entitled to cover the local venting of the train-pipe at each car in order to quicken the serial or successive applications of the brakes along the train; because that principle had been made public in the prior patent of Mr. Westinghouse, No. 217,838, dated July 22, 1879. It was *not* entitled to cover the utilization of the "extreme traverse" of the triple-valve piston for the purpose of making emergency stops; because that had commonly been done for many years in patent 220,556 and others.

It *was* entitled, however, to cover a mechanical device, namely, the auxiliary-valve 41 governing a special by-passage leading directly from the train-pipe to the brake-cylinder—a device which, although of no utility as arranged in patent 360,070, became afterward exceedingly useful when further combined with the supplementary piston, of patent 376,837. In other words, patent 360,070, while not solving the problem of quick-action, furnished for its subsequent solution by Mr. Westinghouse an important *factor*, consisting of the auxiliary-valve and its by-passage, arranged to be put into action by the "extreme traverse" of the triple-valve piston. This patent, 360,070, did not itself accomplish the desired result; but it furnished an *element* for the subsequent combination by which Mr. Westinghouse finally achieved that result. *It should be construed, therefore, as a patent for that element or factor broadly, and for nothing more.*

LEGAL CONSTRUCTION OF PATENT 360,070.

If, now, we carefully examine patent 360,070, we shall find that it covers that element, the auxiliary-valve and by-passage in combination with the old automatic brake elements.

The specification commences (page 782), with a statement of the invention, and then describes, in a general way, the old plain triple-valve—this part of the description running to the top of page 784. It then says, on page 784 (the italics being ours):

“So far as the performance of its preliminary function
“in ordinary braking is concerned—that is to say, effect-
“ing the closure of communication between the main
“air-pipe and the auxiliary-reservoir and the opening of
“communication between the auxiliary-reservoir and the
“brake-cylinder in applying the brakes, and the reverse
“operation in releasing the brakes—the triple valve 10
“accords substantially with that set forth in letters patent
“of the United States No. 220,556 granted and issued to me
“October 14, 1879, and is NOT, THEREFORE, *saving as to*
“*the structural features by which it performs the further*
“*function of effecting the direct admission of air from*
“*the main air-pipe to the brake-cylinder*, as presently to
“be described, CLAIMED as of my present invention.
“Certain of its elements devised and employed by me
“prior thereto will, however, be herein specified in order
“to render its construction and operative relation to other
“members of the brake mechanism fully intelligible.”

This is a plain and emphatic direction, by Mr. Westinghouse himself, as to *how* the claims are to be construed. They are to be construed as covering only the “*structural features*” by which the direct admission of air from the train-pipe to the brake-cylinder is effected.

The specification then proceeds, to the bottom of p. 785, to describe in greater detail the devices which correspond to those of the old plain triple-valve, including the graduating valve 29 and the restricted port 35 through the main valve 14; after which, not content with the emphatic statement above quoted, it again says:

"So far as hereinbefore described, the triple-valve accords in all substantial particulars with and is adapted to operate similarly to those of my letters patent Nos. 168,359, 172,064, and 220,556, and, in order that it may perform the further functions requisite in the practice of my present invention, it is provided with *certain additional members*, which will now be described."

In the next twenty-two lines following the paragraph last quoted, the specification describes the new auxiliary-valve 41 and its check-valved by-passage, 42, 43, 46, 47, 48, as the said "additional members" by which the new functions of the structure are performed.

Following this is a long description of the operation of the structure, a disclaimer, and the claims.

We have already seen that the *invention* was limited to the *additional* element or factor, the new auxiliary-valve 41 and its by-passage, for effecting the direct admission of air from the train-pipe to the brake-cylinder; we now see that the *patent* limits itself to this new element or factor, both by declaring that it is this *new* factor which produces the desired result, all else being old, including the two traverses of the triple-valve piston, and by directing that the claims are to be construed as for these "*structural features*" by which this result is accomplished.

Whatever claims the patent may contain, therefore, must be construed in the light of these statements found in the patent itself. The stream can rise no higher than the source—the patent can claim nothing beyond the invention.

The claims in suit are as follows :

"1. In a brake mechanism, the combination of a main air-pipe, an auxiliary reservoir, a brake-cylinder, a triple-valve, and an auxiliary-valve device, actuated by the piston of the triple-valve and independent of the main valve thereof, for admitting air in the application of the brake directly from the main air-pipe to the brake-cylinder, substantially as set forth.

"2. In a brake mechanism, the combination of a main air-pipe, an auxiliary reservoir, a brake-cylinder, and a

"triple-valve having a piston whose preliminary traverse
 "admits air from the auxiliary reservoir to the brake-
 "cylinder, and which, by a further traverse, admits air
 "directly from the main air-pipe to the brake-cylinder,
 "substantially as set forth.

* * * * *

"4. The combination, in a triple-valve device, of a
 "case or chest, a piston fixed upon a stem and working in
 "a chamber therein, a valve moving with the piston-stem
 "and governing ports and passages in the case leading to
 "connections with an auxiliary-reservoir and a brake-
 "cylinder and to the atmosphere, respectively, and
 "an auxiliary-valve actuated by the piston-stem and con-
 "trolling communication between passages leading to
 "connections with the main air-pipe and with the brake-
 "cylinder, respectively, substantially as set forth."

It will be observed that *these three claims are for one and the same invention*, being merely different expressions thereof.

There can be no question as to the proper legal construction of claims 1 and 4, both of which are, in terms, expressly limited to a combination containing the new *auxiliary-valve*, and also containing (in claim 4 expressly, and in claim 1 by necessary implication) the by-passage governed by said valve.

The Defendants, as we shall hereinafter show, *do not employ an auxiliary-valve or by-passage, nor any mechanical equivalent thereof, for admitting train-pipe air to the brake-cylinder*. Judge Morris, of the Circuit Court, so held, and the Circuit Court of Appeals affirmed his ruling on this point.

The Complainants, however, contend that *claim 2* is to be broadly construed as covering any triple-valve in which the old *further traverse* of the piston is retained in making an emergency stop where the train-pipe air is admitted directly to the brake-cylinder, whether by means of the auxiliary-valve and by-passage, or their mechanical equivalent, or by any other means whatsoever. On this question Judge Morris held, in substance, that claim 2 is entitled to cover not only mechanical, but *functional* equivalents, and that, therefore, the Defendants' apparatus, while not an infringement of claims 1 and 4 (because it does not contain the auxiliary-valve and by-passage, or their mechanical equivalents), falls within the scope of claim 2,

because it produces the same *result* by other means. The Circuit Court of Appeals strongly disaffirmed this conclusion, both as contrary to law and as evidently based by Judge Morris upon his erroneous belief that the patent in suit was the first to show a triple-valve piston having a partial traverse for graduation and a further or extreme traverse for emergency stops.

The whole controversy in the Supreme Court hangs upon the question whether the Circuit Court of Appeals was right in its conclusion upon this point, or whether Judge Morris was right.

That the Circuit Court of Appeals was right, appears conclusively, we submit, from the following facts:

1. The invention of patent No. 360,070 did *not* consist in giving the triple-valve piston a partial traverse for graduation and a "further traverse" for emergency stops; because automatic triple-valves for years prior to patent 360,070 contained and used that feature, as we have already shown, and as the Circuit Court of Appeals conclusively demonstrated in the paragraph commencing on p. 879 and ending on p. 880. Moreover, the specification of patent 360,070 makes no claim to any novelty in such feature, but asserts repeatedly that the triple-valve itself, apart from the auxiliary-valve 41 and its by-passage, "accords in all substantial particulars with, and is adapted to operate similarly to, those of my letters patent Nos. 168,359, 172,064 and 220,556" (p. 78), "and *is not*, therefore, saving as to the *structural features by which it performs the further function* of effecting the direct admission of air from the main air-pipe to the brake-cylinder, as presently to be described, *claimed* as of my present invention." (Page 784).

To assert any novelty, therefore, in the partial traverse and further traverse, is to assert not only what is not true in fact, (H. H. Westinghouse, p. 307, Aus. 488) but what is expressly denied to be true in the patent itself.

2. The patent also clearly and positively declares that the invention resides solely in the *addition* of the auxiliary-valve

41 and its by-passage, to the old well-known triple-valve. It resides in the "structural features" by which the old triple-valve "performs the further function of effecting the direct admission of air from the main air-pipe to the brake cylinder" (p. 784), and in the "*certain additional members*" by which the old triple-valve is enabled to "perform the further functions requisite in the practice of my present invention" (p. 786). Without these "structural features" or "additional members," the invention of Mr. Westinghouse is not present. The claims no matter how they may read, must, by legal construction, be limited to the *invention*—otherwise they would be invalid. So limited, they only cover combinations containing an auxiliary-valve 41 and its by-passage, or their mechanical equivalents; and are not infringed by the defendants.

3. In any event, the auxiliary-valve and its by-passage must be read into claim 2, in order to prevent the claim from being void as covering a mere *function or result* independently of the means for its accomplishment.* The claim refers to "a *piston* (the old piston) whose preliminary traverse admits air from the auxiliary-reservoir to the brake-cylinder, and which by a further traverse admits air directly from the main air-pipe to the brake-cylinder." *The piston does no such thing.* Its function on the further traverse is to move the main-valve 14 and also *to move the auxiliary-valve 41*, and it is the latter, together with its by-passage, which "*admits air directly from the main air-pipe to the brake-cylinder.*" Without the auxiliary-valve 41, the *piston* is the same old piston which had been known, used, and patented, many years before the patent in suit, and a claim upon it in patent 360,070 would certainly be invalid. It is perfectly clear, therefore, that the auxiliary-valve 41 and its by-passage must be read into claim 2, in order to save the claim from being functional, to make it include the *necessary* elements for accomplishing the result, and to

* Whether they can properly be read into claim 2 involves a serious question of law, which is discussed by Mr. Church in another brief herewith filed. If they can *not*, the claim is clearly invalid; if they *can*, we do not infringe it. The object of the present brief is to discuss only the question of infringement, leaving the other question to Mr. Church's brief.

differentiate it from the old structure of patent 220,556, which employed the *same* piston having the *same two traverses*. The expression, "whose preliminary traverse admits air from the auxiliary-reservoir to the brake-cylinder, and which by a further traverse admits air from the main air-pipe to the brake-cylinder," is simply the expression of a *result*; and that expression must be translated or interpreted into the mechanical means which produce the result, or else the claim must be held void. (*O'Reilly vs. Morse*, 15 How. 62, 119). So translated, this claim is not limited to less than what Mr. Westinghouse invented; but it does complete justice to him, fully covering everything which he added to the old triple-valve or which he described in his specification as new.

The claim must also be so translated as above, in order to give effect to its concluding words, "*substantially as set forth*." Mr. Westinghouse "set forth" no other means of producing the result, except the auxiliary-valve 41 and its by-passage. These words, therefore, become idle and meaningless except as a direction to the court to construe the auxiliary-valve and by-passage into the claim.

"Where the claim immediately follows the description
"of the invention, it may be construed in connection with
"the explanation contained in the specifications; and
"where it contains words referring back to the specifications,
"it cannot properly be construed in any other
"way."

Seymour vs. Osborne, 11 Wall., 547.

Miller vs. Eagle Mfg. Co., 151 U. S., 186, 202.

The Complainants are simply endeavoring to expand the second claim *beyond the invention* of Mr. Westinghouse and to make it include the accomplishment of the result by means which do not involve an auxiliary-valve and by-passage, but act upon an altogether different principle and by a totally different mode of operation.

4. Our position is strongly confirmed by certain admissions found in the Complainants' brief used in the Circuit Court of

Appeals for the Fourth Circuit. Thus, on page 40 of that brief, Complainants' counsel say :

" Thus it will be seen that this quick-action *attachment*, consisting of an *air-conduit or passage-way directly from the train-pipe connection to the brake-cylinder and a valve to control it*, such valve being itself under control of the triple-piston and so combined with the old automatic brake appliances that not interfering with the ordinary use of the latter it, the quick-action *attachment*, may be used as an *auxiliary* emergency device in the presence of great or serious danger—that *this*, the chief novelty and element of utility of the Westinghouse invention now in controversy, *is so made the subject matter of every claim in controversy as to give character and effect thereto*, and render the scope of the claim co-extensive with the invention."

Again, on page 31 of the same brief, the distinguished counsel for Complainant, after describing the old automatic triple-valve, refer to the new invention of patent 360,070 in the following words :

" Westinghouse added to and combined with this brake *another brake mechanism*, which, on account of its novel predominant characteristic or function, has given to the whole apparatus its own name of *quick-action* or *emergency brake*—both names being used. And he so combined these two mechanisms, 'the service' and 'the quick-action; that while, in fact, they constitute *two machines*, they are also included in a *single structure*, and are put into a co-acting or co-operating mechanical relation with each other, as will presently appear."

Counsel here mean that the old triple-valve was one machine, and the new auxiliary-valve 41, with its by-passage, was *another* "machine," and that the invention of patent 360,070 consisted in the combination of these two machines in one structure—a statement with which we entirely agree, and with which the

Circuit Court of Appeals, for the Fourth Circuit (p. 876), fully concurred. But it follows that machine No. 2 is a necessary element of the combination; that it must, by legal construction, be read into any claim which does not already express it, and that there can be no infringement where the defendant does not use it. These two admissions are conclusive as to the whole controversy over the legal construction of claim 2.

5. Our position is also conclusively confirmed by the exhibit, "*File - Wrapper and Contents*," of patent No. 360,070 (pp. 705 to 724).

It appears from this exhibit that the application for the Westinghouse patent was filed November 19, 1886; that the broad claim 1 and the more limited claim 2 were both rejected on the prior patent of Boyden, dated June 26, 1883, No. 280,285, and that on January 19, 1887, Mr. J. Snowden Bell, attorney for Mr. Westinghouse, wrote a letter to the Patent Office in which he erased the original broad claim 1 and substituted the present narrower claim 1, and made an argument in favor of the allowance of claim 2. In this argument he says (p. 718, near the bottom):

"It is to be understood that applicant (Westinghouse) *does not seek to broadly claim* a device for admitting "air directly from the main air-pipe to the brake-cylinder, "as the four-way cock long heretofore employed by him " (similar to the cock *K* of the Boyden patent) would be "a structure of such character. *When, however, the "triple-valve is provided with an auxiliary-valve operated "by its piston, which performs a new function addi- "tional to that of the triple-valve as previously employed, "it is believed that such combination is wholly novel."*

The above statement in the Patent Office file, on which claim 2 was reconsidered and allowed, undoubtedly operates, in law, to read the auxiliary-valve into claim 2; and it is a question whether it does not also operate to further limit the auxiliary-valve to one which is actuated by the direct impact

of the piston-stem, as described and shown in the patent. However the latter may be, it is certain that, in view of this statement of Westinghouse's Attorney, and of repeated decisions of this high tribunal as to the legal effect of such admissions made during the progress in the Patent Office of an application for letters patent, no court can rightly construe claim 2 as a broad claim unlimited to the "Auxiliary-Valve 41."

Moreover, claim 1 of the application was originally as follows:

"1. In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder and *a triple-valve provided with a device* for admitting air directly from the main air-pipe to the brake-cylinder, substantially as set forth."

This broad claim (p. 714) was withdrawn (bottom of page 717), and the present claim 1 was substituted, limited in terms, to "an auxiliary-valve," "actuated by the piston of the triple-valve," and "independent of the main-valve thereof."

Again, the specification, as originally filed, contained the following broadening statement (top of p. 714):

"Further, while in the specific construction described and shown, the function of admitting air from the main-pipe is performed by a valve separate from that which effects the preliminary admission of reservoir-pressure to the cylinder, a modification in which the same office is performed by a valve integral with the main-valve and formed by an extension thereof, would be included in and embody the essential operative features of my invention."

This clause, also, was stricken out during the progress of the application through the Patent Office; so that the legal construction of the patent, as issued, is, that the auxiliary-valve must be separate from the main-valve and not formed by an extension thereof.

We see, then, *first*, that the invention of patent 360,070 was not, in and of itself, a solution of the problem of "quick-action" or of the prevention of shock in long trains, but merely furnished a device which, in combination with other devices subsequently invented, became a useful factor in Mr. Westinghouse's

later invention of patent 376,837; *second*, that whatever invention was contained in patent 360,070 consisted only in *adding* the auxiliary-valve 41 and its by-passage to the old triple-valve; *third*, that the specification of patent 360,070 described the invention as consisting merely in this addition, and directed the claims to be construed as limited thereto; *fourth*, that claim 2 must be held invalid unless the auxiliary-valve and by-passage are read into it; *fifth*, that Complainants' counsel admit that the auxiliary-valve and by-passage are "so made the subject matter of every claim in controversy as to give character and effect thereto"—the invention consisting practically in the combination of "*two machines*," one of which is the old triple-valve, and the other the new devices added to it by Mr. Westinghouse; and *sixth*, that while the application was pending in the Patent Office, Mr. Westinghouse, through his attorney, confined the invention to the new auxiliary-valve actuated by the piston of the triple-valve, and struck out all broad claims and broadening statements of the specification which might be in conflict with that theory.

It would seem that further argument on this point was unnecessary, but we cannot leave the subject without commending to the attention of the court the masterly reasoning of the Circuit Court of Appeals below, which fully sustains our position in every respect, nor without calling the attention of the court to the case of *The Westinghouse Air Brake Co. vs. The New York Air Brake Co.*, in the Southern District of New York (69 Fed. Rep., 71⁷; 16 C. C. A., 371, 373, 374, 376).

NEW YORK SUIT.

In that case Judge Lacombe (16 C. C. A. 371), referring to patents 360,070 and 376,837, said that they "disclosed the one, the emergency valve" (meaning auxiliary-valve 41), "the other the supplemental piston or special motor, which, so far as the art has now progressed, appear to be both essential to the structure of a successful quick-action air-brake."*

*The Boyden brake used by defendants here was not before Judge Lacombe, and he was ignorant of the fact that Boyden had solved the problem of quick action by *another plan* not involving the use of either an auxiliary-valve or a supplemental piston.

Then, on page 373, 16 C. C. A., referring to claim 1 of patent 360,070, Judge Lacombe said :

“The means for actuating the auxiliary-valve device “is stated in the claim to be ‘the piston of the triple-
“valve.’ And the way in which it acts, as shown in the
“patent, is by direct impingement upon the stem of the
“auxiliary-valve device.”

On page 374, same volume, referring to claim 2 of patent 360,070, he said :

“The discussion of the first claim *applies equally to*
“*this one.* In the first claim, actuation by the piston
“of the triple-valve was made an element. In this
“claim the inventor *more closely limits the mode of*
“*such actuation.* It is to be by a ‘further traverse’ of
“that ‘piston.’”

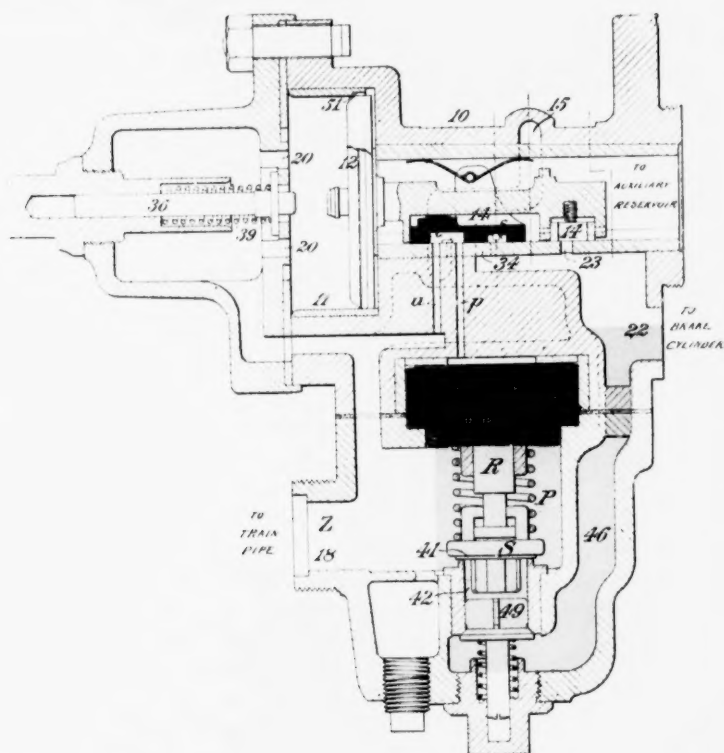
The Defendant in that case used the “auxiliary-valve” device, but actuated it *indirectly* by the piston of the triple-valve, and was found guilty of infringement. (See cut of New York Company's valve structure on opposite page. The auxiliary-valve device is shown in red.)

The Circuit Court of Appeals for the Second Circuit affirmed the decision of Judge Lacombe (16 C. C. A., 376), saying, with respect to patent 360,070, simply, that they “deem it unnecessary to add anything to the opinion of Judge Lacombe.”

It therefore clearly appears that Judge Lacombe, the Circuit Court of Appeals for the Second Circuit, and the Circuit Court of Appeals for the Fourth Circuit, are all in full accord with us on the proposition of law that the auxiliary-valve 41 must be read into claim 2 of patent 360,070. So construed, all the claims in suit are limited to the auxiliary-valve 41; and it only remains to show that the Defendants here do not use such valve or any mechanical equivalent thereof.

New York Brake Co.'s Valve.

Held to infringe by Judge Lacombe because it contained the "Auxiliary Valve" device (shown in red) of Patent 360,070.



The "Auxiliary Valve 41" of Patent 360,070 is shown in red, and the "Supplemental Piston" and chamber of Patent 376,837 shown in brown.

Defendants Triple Valve Structure.

With the Immovable Partition 9 inserted.

Fig. 1. Release Position.

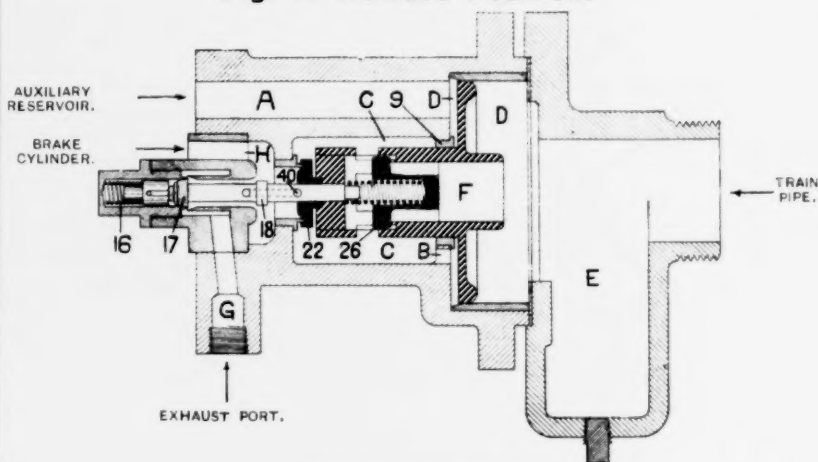


Fig. 2. Quick-Action Position.

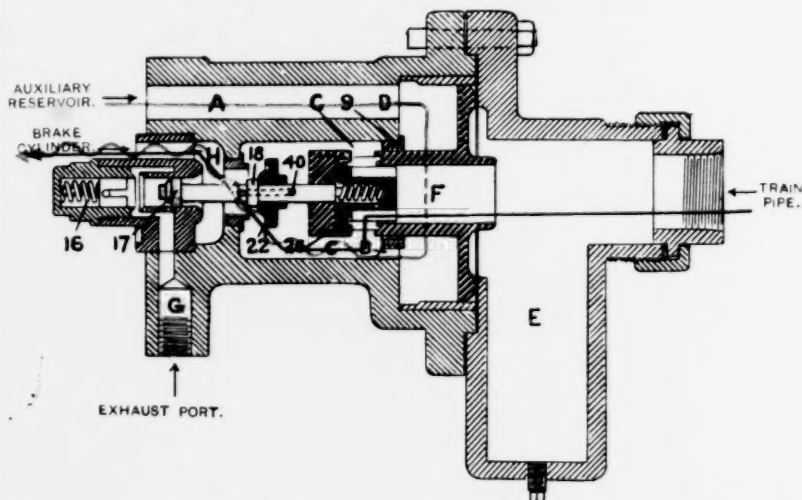


Fig. 2 shows the Defendants Triple Valve Structure in the quick-action position, and the Main Valve 22 in the act of admitting both Train Pipe and Auxiliary Reservoir airs to the Brake Cylinder.

The course of the Train Pipe Air is shown by a Blue line, and that of the Auxiliary Reservoir Air by a Red line. It will be noted that both airs commingle in the Triple Valve chamber C, and together pass to the Brake Cylinder through the port opened by the Main Valve 22 (black), thereby not requiring an Auxiliary Valve to admit the Train Pipe Air.

THE DEFENDANTS' QUICK-ACTION AIR-BRAKE.

The Defendants are charged with infringing claims 1, 2 and 4 of patent 360,070, by making, selling and using a brake apparatus like that patented to George A. Boyden, August 16, 1892, Nos. 481,134 and 481,135 (pages 797 and 809), the respective applications for which patents were filed in the Patent Office, the first one September 30, 1889, before this suit was brought, and the second one March 6, 1891.

The Defendants' device is illustrated in the cuts printed on the opposite page.

In this device no auxiliary valve or by-passage is employed; but the quick-action result is effected simply by properly proportioning the ports and passages of the old plain triple-valve and using a fixed partition (9) to divide the piston chamber D from main-valve chamber C. With the ports and passages of the old triple-valve properly proportioned, the partition 9 is the element which produces "quick action" in the Boyden structure. The partition is not a valve nor the mechanical equivalent of a valve, but is merely a metal ring screwed immovably into the triple-valve casing, and serving to divide the piston-chamber from the main-valve chamber. It was a new element never before found in triple-valves, and it introduced a new principle and mode of operation totally different from anything ever invented by Mr. Westinghouse or any other inventor. It involved a new and brilliant discovery and invention on the part of Mr. Boyden, of masterly ingenuity and originality.

The effect of the partition 9 is to make the main-valve 22 (black) of the triple-valve admit the train-pipe air to the brake-cylinder at the same time it admits the auxiliary-reservoir air thereto. The simultaneous admission of the two airs through the port of the main-valve 22 is shown by colored lines in Fig. 2, on opposite page.

In embodying this new principle, Mr. Boyden adopted the general form of triple-valve shown in the expired Westinghouse patent, No. 141,685, dated August 12, 1873 (p. 736) in which the main-valve 22 is of the poppet form, and a separate valve 17 controlled by a rod sliding through the main valve is employed for releasing the brakes. For charging the auxiliary-reservoir, he adopted, from the expired Westinghouse patent No. 144,006,

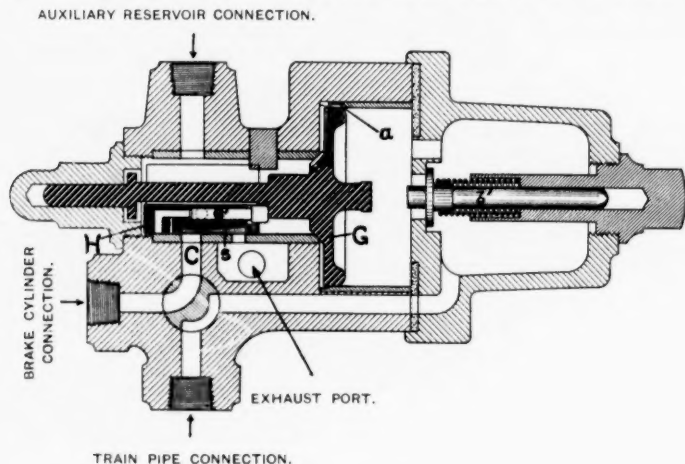
dated October 28, 1873, (p. 740), a check-valved feed passage through the triple-valve piston (Hogan, p. 284, Ans. 413); but arranged the feed passage and its check-valve 26, in a tubular extension F, of the piston, and substantially in the form shown in Fig. 3 of his own patent, No. 280,285, dated June 26, 1883 (p. 776, and see cuts opposite to p. 498). He also provided a sensitive graduating valve, similar in results to the graduating valve *e*¹ of the now expired Westinghouse Patent, No. 220,556, dated October 14, 1879, by so arranging a small passage 40 in the sliding-stem which actuates the release-valve that said passage will be opened and closed by the sliding of said stem through the main-valve 22. As thus constructed, the triple-valve operates in all respects substantially the same as that of patent 220,556, and like the latter, is incapable of "quick-action."

The two cuts on opposite page represent respectively the old plain triple-valve patent No. 220,556 and Defendants' structure *without* the partition 9. The corresponding valves in both cuts are colored alike in order that they may be readily located in the following analogy :

ANALOGY.	Defendants' Structure.	Patent No. 220,556.
In both there is a feeding-in-valve (<i>blue</i>) to charge the auxiliary-reservoir—designated.....	26	<i>a</i>
In both there is a graduating-valve (<i>yellow</i>) which is opened by the "preliminary traverse" of the piston to admit auxiliary-reservoir air to the brake-cylinder—designated.....	40	<i>e</i> ¹
In both there is a main valve (<i>black</i>) which is opened by the "further traverse" of the piston to also admit auxiliary-reservoir air to the brake-cylinder—designated.....	22	<i>H</i>
In both there is a release-valve (<i>green</i>) which discharges air from the brake-cylinder to the atmosphere—designated.....	17	<i>s</i>

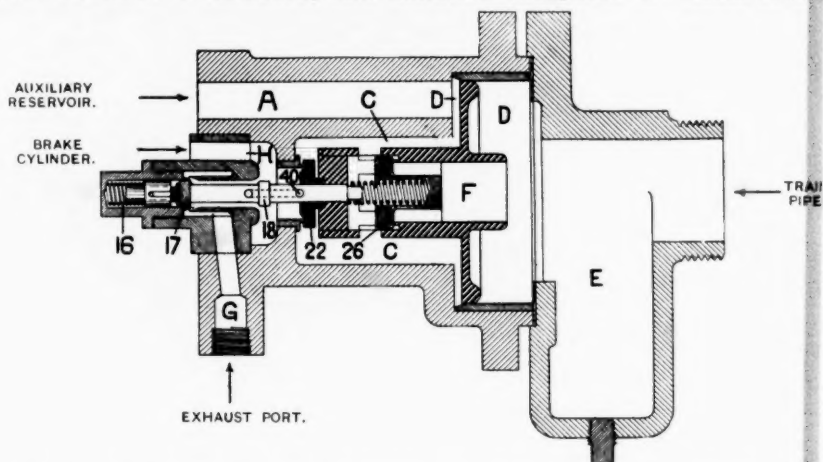
Both of these devices are plain "triple-valves" incapable of

Triple Valve of Patent 220,556 of 1879.



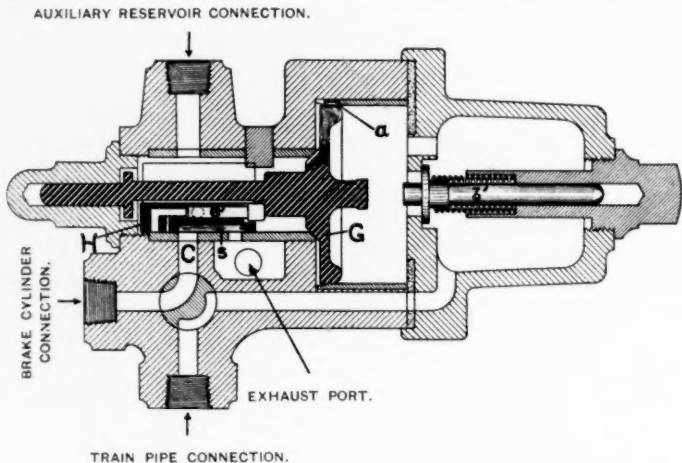
Defendants Triple Valve Structure

With Partition 9 Removed, and therefore incapable of Quick-Action



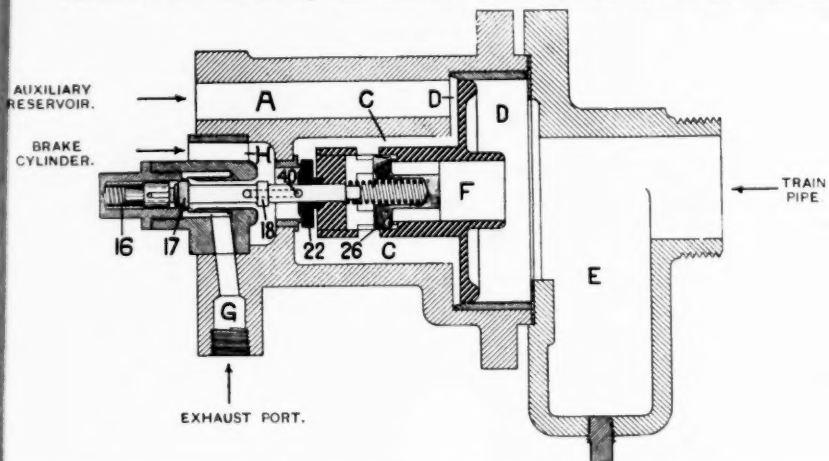
In both structures there are four valves—Feeding-in Valve, Blue; Graduating Valve, Yellow; Release Valve, Green, and Main Valve, Black. The valves all functionate as Triple Valves, and it follows that if said valves are "Triple Valves" in 220,556, they are also Triple Valves in defendants structure. The piston in both has a "preliminary traverse" and "further traverse," the two traverses being old, and used since 1873.

Triple Valve of Patent 220,556 of 1879.



Defendants Triple Valve Structure

With Partition 9 Removed, and therefore incapable of Quick-Action



In both structures there are four valves—Feeding-in Valve, Blue; Graduating Valve, Yellow; Release Valve, Green, and Main Valve, Black. The valves all functionate as Triple Valves, and it follows that if said valves are "Triple Valves" in 220,556, they are also Triple Valves in defendants structure. The piston in both has a "preliminary traverse" and "further traverse," the two traverses being old, and used since 1873.

"quick-action," the operation of 220,556 being described on pp. 5, 6 and 7 of this brief. They each produce exactly the same result, and each of the four valves in the two devices perform the same function. If the said valves in 220,556 are "triple-valves," it follows that the corresponding valves in Defendants' structure are *also* triple-valves.

Each structure has a piston with a "preliminary traverse" to open the graduating-valve (yellow) to partially or slowly apply the brakes, and a "further traverse" to open the main-valve (black) for a quick or an emergency application of the brakes. Both these devices are old and public property. The Defendants' device, as here shown, does *not* contain the "partition 9."

Starting from this point, Mr. Boyden, with the *poppet* form of the old triple-valve 141,685, before described, and Mr. Westinghouse, with the triple-valve of patent 220,556, both inventors sought to solve the problem of "quick action," but they proceeded in very different directions, and by respectively calling to their aid means which are so unlike as to be absolutely incapable of comparison with each other, and of which the Circuit Court of Appeals, in its opinion (p. 880), said:

*"They seem to us to differ as widely from each other
"as two devices for accomplishing the same result can
"well differ."*

Mr. Boyden conceived the idea of developing the *latent* capabilities of the valves of the old triple-valve by *creating therein special differential pressures*, so that *these same valves* will have the *new power* of admitting train-pipe air to the brake-cylinder for emergency applications of the brakes. Mr. Westinghouse had the idea of retaining the old triple-valves to do no more than their old functions, and in order to obtain the new object he conceived the plan of *adding* a new auxiliary-valve 41 and its by-passage to the old triple-valve of patent 220,556, thereby, as Complainants' counsel admit, adding a *new "machine"* to the old one, and combining both together in one structure; and he produced, *not* "quick-action," but an "auxiliary valve" device, which, at a later period, became a *factor* of paramount importance to him in the production of quick action.

Mr. Boyden added no new valve or by-passage—no new *machine*—but he simply connected his auxiliary-reservoir to

the inner end of the *piston-chamber* by means of a capacious passage *A*, and divided said piston-chamber from the main valve chamber by a partition 9 having a passage *B* the capacity of which was less than that of the passage *A*, and intermediate in size between that of the graduating passage 40 and that of the port covered by the main valve 22—and he thereby produced a perfect quick-action triple-valve.

The operation of the Boyden device was as follows :

Recharging the auxiliary reservoir and releasing the brakes.—The engineer accomplishes these functions, as in all automatic air-brakes, by increasing the pressure in the train-pipe. This forces the triple-valve piston to the inner end of its traverse (as shown in the upper cut opposite p. 35), unseating the release-valve 17 and releasing the brakes, seating the main valve 22, and closing the graduating port 40. The pressure of train-pipe air now lifts the feed-valve 26 (as in Westinghouse patent No. 144,006 and Boyden patent No. 280,285), and flows into the main-valve chamber *C*, whence it passes back through the restricted opening *B* into the space between partition 9 and the triple-valve piston, and thence flows through passage *A* to the auxiliary-reservoir. When the pressure in the train-pipe reaches its maximum of 70 pounds and ceases to further increase, the check-valve 26 becomes seated by its spring, thereby preventing any reflux of air from the auxiliary-reservoir to the train-pipe; and the pressures equalize in the auxiliary-reservoir, the main-valve chamber, and the passages connecting them. The apparatus is now in its normal running condition.

Graduating.—The engineer effects this function, as in all automatic air-brakes, by discharging about 10 pounds of air-pressure from the train-pipe. The superior pressure of the auxiliary-reservoir now moves the triple-valve piston through its partial traverse, thereby causing the release-valve 17 to seat and close communication between the brake-cylinder and the atmosphere. At the same time, the piston, by said partial traverse, draws its own stem back through the main-valve 22 far enough to open the graduating port 40 and allow auxiliary-reservoir air to flow slowly into the brake-cylinder and set the brakes with a light pressure. The auxiliary-reservoir pressure in the valve chamber *C* meanwhile holds the main-valve 22 so

firmly seated that when the collar 18 on the piston stem strikes the main-valve it does not unseat the latter, but merely arrests the movement of the piston, thereby limiting the latter to its partial traverse. The passage *B*, being larger than the graduating port 40, supplies more air than can escape through the latter, and therefore maintains an equality of pressure between the auxiliary-reservoir and the main-valve chamber. This pressure slowly decreases by the vent through port 40 into the brake-cylinder, and when it becomes slightly lower than the train-pipe pressure (now 60 pounds), the latter moves the piston back far enough to close port 40. The piston cannot move far enough, however to open the release port, because, in attempting to do so it would necessarily have to compress, and thereby increase the resistance of, the auxiliary-reservoir air (which is now confined without means of escape), and also because of its own friction. If the engineer desires to increase the pressure of his brakes, he discharges a few more pounds of air from the train-pipe, and the operation above described is repeated; and so on, till he reaches any degree of brake-pressure required for slacking the speed of the train or bringing it to a "service-stop," as the case may be. He releases the brakes and recharges the auxiliary-reservoir by increasing the train-pipe pressure to its normal 70 pounds.

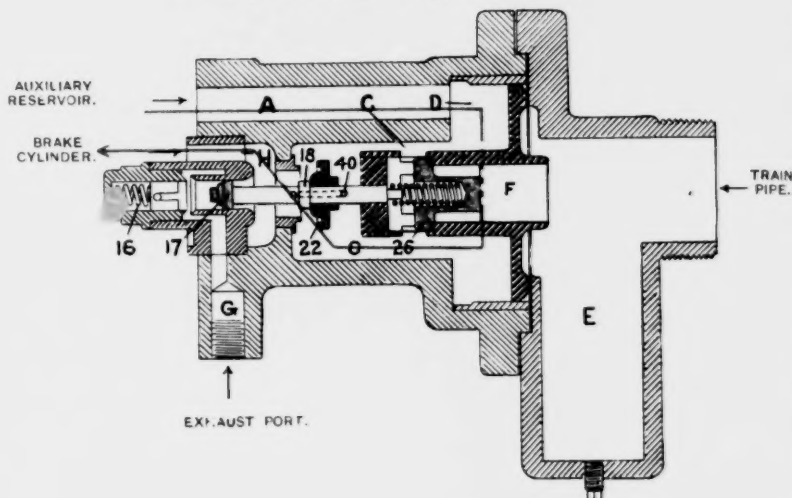
Making an Emergency Stop.—When the engineer discovers danger closely impending, he instantly throws his governing-valve wide open. This suddenly vents a larger amount of air (15 or 25 pounds) from the train-pipe. The auxiliary-reservoir pressure on the first car is now so greatly in excess of the train-pipe pressure that the preponderance instantly forces the triple-valve piston to the extreme outward limit of its traverse, thereby causing the main-valve 22 to unseat and fully open its port, so that auxiliary-reservoir air can flow rapidly and freely to the brake-cylinder to set the brakes with maximum quickness and force.

Up to this point every operation and result have been precisely the same as those of the old automatic air-brakes in use prior to the date of the patent in suit—1887. But now a new action takes place, peculiar to the new Boyden brake, and constituting its new principle and mode of operation, The port of the main-valve 22 is so much larger than the passage B that the pressure in the main-valve chamber C is instantly emptied into the brake-cylinder, and, as the passage B cannot supply air so fast as the main-valve port can exhaust it, the pressure in the main-valve chamber suddenly drops to about 5 pounds. Meanwhile the passage A, leading from the auxiliary-reservoir to the inner end of the piston-chamber, is so much larger than the passage B, leading from the piston-chamber to the main-valve chamber, that full reservoir pressure is maintained in the piston-chamber between the partition 9 and the inner side of the piston, thereby holding the piston back firmly at its extreme traverse. But the feed-valve 26 (blue) is now exposed on the one side to a train-pipe pressure of about 55 pounds, and on the other side to a main-valve-chamber pressure of only about 5 pounds, and therefore valve 26 is instantly forced open by the greater train-pipe pressure, which then vents freely through the said feed-valve port into the main-valve chamber C, where it commingles with the auxiliary-reservoir air passing through said chamber, and both airs pass together through the port opened by the main-valve 22 to the brake-cylinder. The whole operation is substantially instantaneous, and the result is that the train-pipe is freely vented at each car, the time of serially or successively applying the brakes of the several cars from one end of the train to the other is reduced to a minimum, and the train is quickly stopped without shock—a result which Mr. Westinghouse did not attain with the device of patent 360,070, nor did he attain it until he had invented his later apparatus of patent 376,837 not here in suit.

When the Court arrives at a clear understanding of the structure and "mode of operation" of the Boyden brake, it will see at once that, in the Boyden device, the partition 9 is the controlling element which produces "quick action." When this partition is present, the device operates as a quick-action air-brake; but remove the partition, and the device then operates

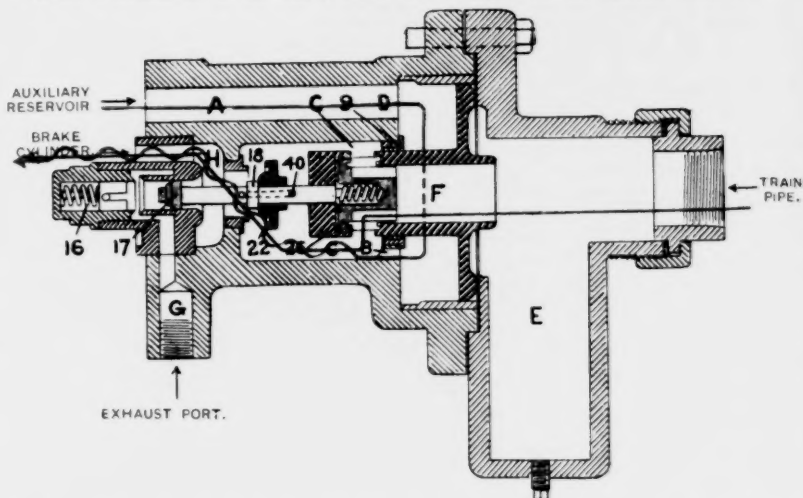
Defendants Triple Valve Structure

With Partition 9 Removed and Incapable of Quick-Action, Operating only as a Plain Triple Valve.



Defendants Triple Valve Structure

With Partition 9 in its Place and Capable of Quick-Action.



In the upper cut the structure operates as a plain Triple Valve, the Main Valve 22 admitting only Auxiliary Reservoir Air to the Brake Cylinder as shown by the Red line, but in the lower cut the structure operates as a Quick-Action Valve. The Main Valve 22 admitting both Auxiliary Reservoir and Train Pipe Air to the Brake Cylinder as shown by the Red and Blue lines.

This great transformation in the operation being due to inserting the partition 9. With the Defendants Structure is a perfect quick-action device without employing any

only as an old triple-valve—precisely like the triple-valve of patent 220,556. (See test'y. of H. H. Westinghouse, p. 336, ans. 601, pp. 345, 346, ans. 647, 648).*

The reason of this is as follows (see cuts on opposite page):

The passage *A* is equal to, or larger than, the port of the main valve 22, and, in the *absence of partition 9* (see Fig. 1), can supply auxiliary-reservoir air to the main-valve chamber *C* as fast as, or faster than, such air can vent from said chamber through the main-valve port to the brake-cylinder. Hence, in the absence of the partition 9, no sudden reduction of pressure in the main-valve chamber *C* is effected by the unseating of valve 22. The result is, that under such condition, the feed-valve 26 cannot be opened, and no train-pipe air can possibly pass into the main-valve chamber. Therefore, only auxiliary-reservoir air is admitted to the brake-cylinder, its course being shown by a red line.

But with the partition 9 in place (see Fig. 2), all this is changed. The opening of the main valve 22 suddenly reduces the pressure of the main-valve chamber *C* to about five pounds; this is due to the partition 9 preventing the auxiliary-reservoir air from freely entering the chamber *C*; the train-pipe air at 55 pounds will instantly pass into the chamber *C* through the feeding-in-valve 26, and thence to the brake-cylinder through the port opened by the main-valve 22 simultaneously with the passage of the auxiliary-reservoir air, thereby making the main-valve perform the two functions. The course of the train-pipe air is shown by a blue line, and that of the auxiliary-reservoir by a red line.

The operation is absolutely certain and reliable; and the invention of Mr. Boyden, by which it is effected, is entitled to rank as a scientific discovery of high order—the discovery that the old-fashioned triple-valve can be operated, simply by *differential pressures*, to produce the important quick-action result which Mr. Westinghouse supposed could be produced only by combining it with *a new machine for that specific purpose*, consisting in a new “auxiliary-valve” actuated by the piston of the triple-valve and controlling an additional by-passage leading from the train-pipe to the brake-cylinder.

*If the Court will permit, we will, with a full-size brake apparatus, operated by air-pressure, give an ocular demonstration of these facts at the hearing.

The Boyden principle is not confined to triple-valves having the main-valve and the release-valve of the "poppet" form, and therefore necessarily separate from each other, but is equally applicable to all other forms of triple valve. If we remove from the Boyden device the poppet main-valve 22 and the release-valve 17, and substitute therefor a slide-valve, exactly as in patent 220,556, with the graduating-valve shown in the latter patent, the result is just the same as with the new Boyden triple-valve above described. The Defendants manufacture triple-valves embodying the same invention in three forms, among which is the slide-valve form, patents for which were all granted on the same day—August 16, 1892, pp. 797-809-817.

THE COMPLAINANTS' ARGUMENT AND THE ANSWER THERETO.

The Complainants' argument is, that the sensitive valve 40 of the Boyden device is the main-valve; and that the valve 22 is only an auxiliary-valve, corresponding to the auxiliary valve 41 of patent 360,070, because it unseats only during the further traverse of the triple-valve piston in making an emergency stop, is unseated by said piston, and, when unseated, admits train-pipe air to the brake-cylinder directly (that is, without said air first passing to the auxiliary-reservoir).

The argument is specious, sounding in words rather than facts; and, when considered with reference to the actual operations of the two mechanical structures under comparison, it is not even plausible on its face. It did not deceive Judge Morris, who said (p. 844):

"In the Boyden mechanism, which is alleged in this case to infringe, I have not been able to satisfy myself

“that Boyden makes use of an “auxiliary-valve” in the
 “sense in which that term is employed in the specifica-
 “tion and in some of the claims of the patent No. 360,070
 “now in suit. * * * * * (p. 845), “and
 “the defendants’ valve 22 must be considered to be the
 “main-valve, and that in Defendants’ mechanism he has
 “been able, *by an ingenious arrangement restricting the*
 “*admission of auxiliary-reservoir air to the triple-valve*
 “*chamber*, to cause the main valve to do *both* main-valve
 “work, when needed, and to do quick-action work, when
 “needed.”

The Circuit Court of Appeals unanswerably refutes the Com-
 plainants’ argument saying (p. 881):

“Boyden’s (22) is not an auxiliary-valve ; it is mechan-
 “ically the original main-valve of the original triple-
 “valve, and it performs the service which is performed
 “by the main-valve of 220,556. It is not the mechanical
 “equivalent of valve four” (auxiliary-valve 41) “in the
 “attached apparatus of Westinghouse simply by reason
 “of its taking part in an emergency service in admitting
 “train-pipe air into the brake-cylinder. In the original
 “triple-valve it (the main-valve) performed no other
 “service than admitting auxiliary-reservoir air into the
 “brake-cylinder; in Boyden’s device it continues to
 “perform that service, and is made incidentally instru-
 “mental in allowing the passage of train-pipe air. The
 “performance incidentally of quick-action service does
 “not make it an auxiliary-valve. It is the *same* valve.
 “The incidental *service* is auxiliary, but *the valve itself*
 “*is the same* and unchanged. We think the Circuit
 “Court was correct in its view that the poppet-valve 22
 “of Boyden is the original main-valve of 220,556.”

In the Boyden device, when the *partition 9 is removed* and the triple-valve is therefore capable of acting only as an old-fashioned triple-valve, it cannot for a moment be contended that valve 22 acts otherwise than as the old main-valve (the slide valve) of patent 220,556 (called the "main-valve" in claim 1 of the latter patent), or that the sensitive valve 40 acts otherwise than as the old graduating valve *e*¹ of patent 220,556. In both devices (Boyden and 220,556) the *partial* traverse of the piston leaves the main-valve covering the main-port to the brake-cylinder, but causes the sensitive valve to open a passage *through the main-valve* and admit auxiliary-reservoir air slowly to the brake-cylinder for graduating purposes; while the *further* or extreme traverse causes the main-valve to uncover the main port and admit auxiliary-reservoir air more freely and quickly to the brake-cylinder for emergency purposes.

By now inserting the partition 9, *which converts the Boyden device to a quick-action triple-valve*, the actions, operations and results of the old plain triple-valve structure, as just described, are not changed, but continue still to be performed just as before. Hence, if the valve 22 was a main-valve before, it is a main-valve still. Neither the valve nor its function is changed by the insertion of the partition 9. Its old emergency function was to open the main port fully and admit auxiliary-reservoir air to the brake-cylinder—a function which it still performs in the same way, and under the same circumstances. On the other hand, both in the Boyden device and in patent 220,556, the sensitive graduating valve performs an office which is subordinate to that of the main-valve, its function being, in the language of claim 1 patent 220,556, "to close or open *a port through the main-valve* without necessarily moving the main valve." This office is useful only for graduation. The sensitive valve, in both structures, is substantially *functus officio* when making an emergency stop.

It is a conspicuous fact that the sensitive graduating-valve 40 of Defendants' device corresponds with THAT valve of the patent in suit which the specification terms "a graduating valve 29." (See patent, page 785, bottom of second paragraph.) Therefore the argument of Complainants' counsel, that Defendants' valve 40 corresponds with the "main-valve" of the Patent in suit, is erroneous and misleading, because in fact said valve 40 corresponds with that valve which the Patent states is the "graduating valve 29."

Complainants' arbitrary and false process of classifying the several valves in Defendants' structure—the valve 40 (or i, j, k) as "*main*," and the valve 22 as "*auxiliary*"—leaves no valve in said structure which is classed as the "sensitive graduating valve;" the Court will, therefore, see that the classification itself is specious and altogether erroneous.

There is one slight and immaterial difference between the main valve of Boyden and that of patent 220,556, incidental to the use of a poppet valve for the former and a slide-valve for the latter. A slide-valve, acting both as a release-valve and a main valve, as in patent 220,556, must, in applying the brakes, be first moved slightly to close release-port, before the graduating valve is permitted to vent air into the brake-cylinder; whereas, with a poppet valve, which necessitates a separate release-valve, the latter must first be moved to close the release port, and the former need not move at all during the graduating operation. When Boyden uses the slide form of main-valve, however, this incidental and merely formal difference entirely disappears.

COMPLAINANTS' AND DEFENDANTS' STRUCTURES COMPARED.

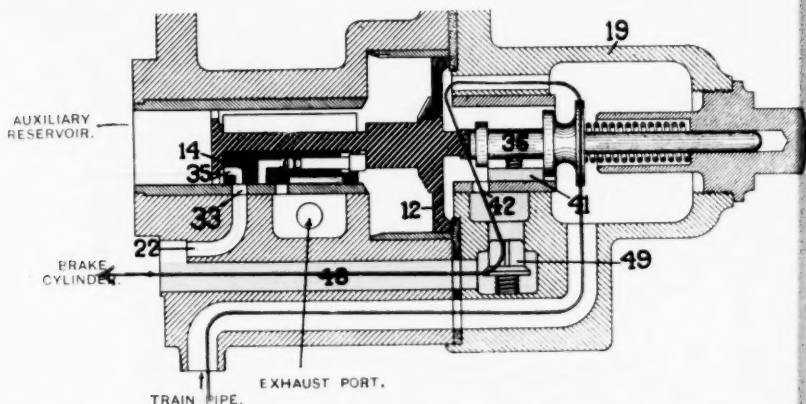
The two cuts on the opposite page represent structures, respectively, of the Complainants and Defendants. In those structures the parts forming the several valves are shown in colors, the corresponding valve in both structures having the same color. The feeding-in-valve is blue; the graduating-valve is yellow; the main-valve is solid black; the release-valve is green. In the Complainants' structure the "auxiliary-valve 41" and by-passage 46 are red.

In the Complainants' structure the piston has to move the graduating-valve (*yellow*), and then the main-valve (*black*) as in the old patent 220,556, and then to move a *third valve (red)* in performing the quick-action function: in the Defendants' structure the piston has to move the graduating-valve (*yellow*) and then the main-valve (*black*) as in the old patent 220,556, but it has to move *no (red or) third valve*—the quick-action being performed by the triple main-valve already moved, due to the partition 9 restricting the flow of auxiliary-reservoir air to the main-valve chamber C.

The course of the two airs (auxiliary-reservoir air and train-pipe air) are shown by colored lines in the cuts.

Fig. 1 shows the Complainants' structure with all the valves in the position they occupy for an "emergency" application of the brakes, wherein the air from the train-pipe (shown by a blue line) passes through a port uncovered by the auxiliary-valve 41, thence through a check valved by-passage (43, 46) to the brake-cylinder. The air from the auxiliary-reservoir (shown by a yellow line) passes through the main-valve port 35, of the triple-valve to the brake-cylinder. Thus, Complainants' structure retains the old main-valve to admit the auxiliary-reservoir air, but employs a new additional valve device to admit the train-pipe air.

Fig. 2 shows the Defendants' structure with all the valves in the position they occupy for an "emergency" application of the brakes wherein the air from the train-pipe (shown by a blue line) passes through the feeding-in-valve passage F into the

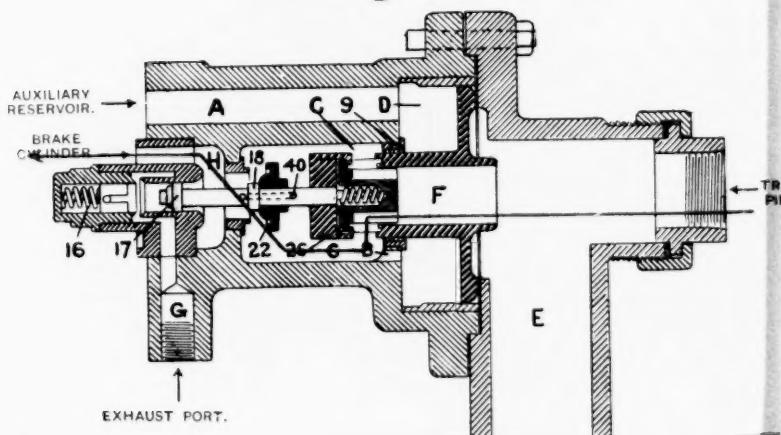


The course of the air from the Train Pipe to the Brake Cylinder is through the Auxiliary Valve and by-pass, colored Red, and is shown by a Blue line while the air passing from the Auxiliary Reservoir to the Brake Cylinder through Main Valve, Black, of the Triple Valve, is shown by a Yellow line. Thus in the complainants structure two machines are required to perform the two functions.

Defendants Structure.

With the Valves in the Quick-Action Position.

Fig. 2.

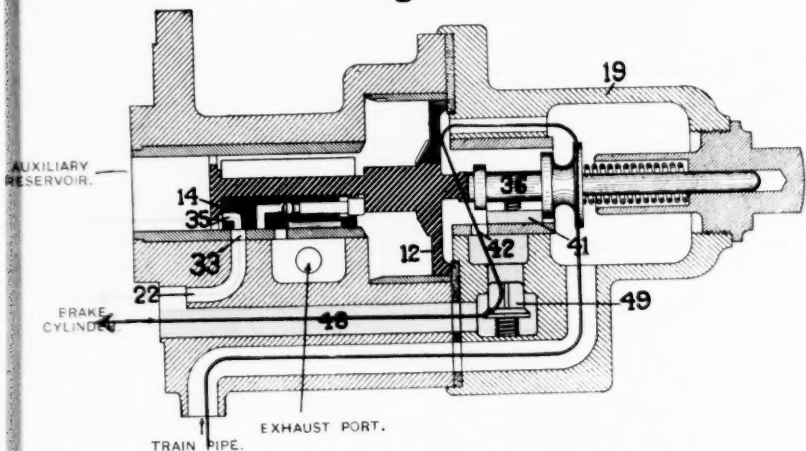


By a blue line, while the air passing from the Auxiliary Reservoir to the Brake Cylinder through the Main Valve of the Triple Valve, is shown by a Yellow line. Thus in the Defendants Structure only one machine is required to perform the two functions.

Complainants Structure of Patent 360,070

With the Valves in the Quick-Action Position.

Fig. 1.

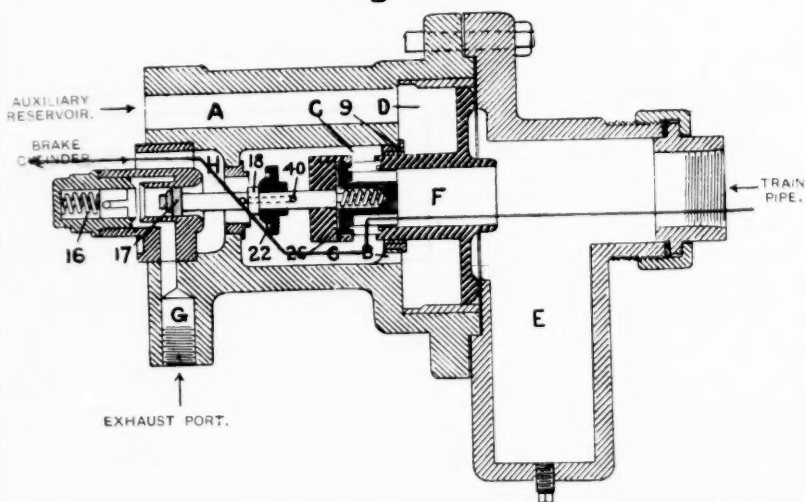


The course of the air from the Train Pipe to the Brake Cylinder is through the port opened by the Auxiliary Valve and by-passage, colored Red, and is shown by a Blue line, while the air passing from the Auxiliary Reservoir to the Brake Cylinder through the Main Valve, Black, of the Triple Valve, is shown by a Yellow line. Thus in the complainants structure two machines are required to perform the two functions.

Defendants Structure.

With the Valves in the Quick-Action Position.

Fig. 2.



The course of the air from the Train Pipe to the Brake Cylinder is through the Trip Valve Chamber C and port opened by the Main Valve 22, Black, of the Triple Valve, and

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triple-valve chamber C, thence through the port uncovered by the main-valve 22 to the brake-cylinder. The air from the auxiliary-reservoir (shown by a yellow line) passes through the passage B, into said valve chamber C, then through the *same* port (uncovered by the main-valve 22) through which the air from the train-pipe is passing, to the brake cylinder, thereby retaining the old main-valve to admit the auxiliary-reservoir air and *causing the same valve* to admit the train-pipe air.

It will be seen from the foregoing that *one valve*, the old main-valve 22 of Defendants' triple-valve, admits *two airs* to the brake-cylinder when applying the brakes for quick applications, instead of *two valves*, the main-valve port 35 and auxiliary-valve 41 as used by Complainant, to admit the *two airs*.

The foregoing comparison of Complainants' and Defendants' devices shows that, while both obtain the same *result* of quick-action, the *means* and mode of operation by which they obtain that result are *totally dissimilar* having absolutely nothing in common. The quick-action *means* of the one is necessarily an auxiliary-valve device whereby train-pipe air may pass direct to the brake-cylinder independent of the triple-valves and "additional" to them, as Mr. Westinghouse correctly states in his patent, and as Mr. H. H. Westinghouse testified at the bottom of p. 124 of the transcript; the quick-action means of the other is a *mere modification* of the triple-valve structure *itself*, consisting of the immovable partition 9 and properly proportioning the original passages, whereby train-pipe air may pass direct to the brake-cylinder through the triple-valves.

It is therefore obvious that the Defendants' structure is totally destitute of the means described and claimed in the patent in suit to admit the train-pipe air to the brake-cylinder.

Mr. Boyden, in making up his triple-valve, used only the old triple-valve elements well known prior to 1886, to wit: The feed-valve of patents 144,006 and 280,285, the main-valve and release-valve of patent 141,685, and the graduating-valve of patent 220,556; and that his triple-valve structure comes squarely under the definition of "triple-valve" as given by Mr. Westinghouse in the specification of the patent in suit, where he says (p. 468):

"In using the terms 'triple-valve' and 'triple-valve device,' I refer to a valve device, *however specifically*

“constructed, having a connection with the main air or
 “brake-pipe, another with an auxiliary-reservoir or
 “chamber for the storage of power, and another with a
 “brake-cylinder or its equivalent for the utilization of
 “the stored power and with a release or discharge pas-
 “sage for releasing the operative power from the brake-
 “cylinder, whether valves governing these passages or
 “connections are arranged in one or more cases and are
 “moved by a piston or its equivalent or by a series of
 “pistons or their equivalents, there being numerous
 “examples in the art of constructions varying materially
 “in appearance whereby these functions are performed,
 “both in plenum and vacuum brake-mechanisms.”

It follows that the Complainants' contention that Boyden's main-valve 22 is an auxiliary-valve, in the sense of patent 360,070, is totally unsound. It is no such thing. Like his feed-valve, his release-valve, and his graduating-valve, it is simply one of the old parts of the old wellknown triple-valve, performing the same old function that it always performed before.

Whenever, in the operation of an automatic air-brake, a valve admits auxiliary-reservoir air to the brake-cylinder, that valve is an essential part of the old triple-valve known in the art long prior to the patent in suit; and it is not the auxiliary-valve 41 of patent 360,070, which does not and cannot perform any such function.

Boyden simply uses the old triple-valve, defined by Mr. Westinghouse as well known in the prior art; and he enables it, as Judge Morris correctly holds (p. 845):

“By an ingenious arrangement restricting the admis-
 “sion of auxiliary-reservoir air to the triple-valve cham-
 “ber, to cause the main-valve to do *both* main-valve
 “work when needed, and to do quick action work when
 “needed.”

THE TWO DECISIONS BELOW.

Judge Morris committed the legal error of holding that claim 2 of patent 360,070 is entitled to cover functional equivalents (p. 846). He evidently based this judgment upon the mistaken idea that patent 360,070 was the first to show a triple-valve piston having, for emergency-stop purposes, a further

traverse than for graduating purposes. He speaks of the "further traverse" as something "unusual" in air-brakes (p. 843); although, as the evidence shows, it is found in triple-valves from the original patent, No. 141,685, to the present time. Indeed, if a triple-valve be capable of venting auxiliary-reservoir air to the brake-cylinder slowly for graduation and quickly for emergencies, there is no other conceivable way in which it can be done than by giving the piston two ranges of traverse, so that it can partially open the main port for the one purpose and fully open it for the other.

His assumption of fact being wrong, the conclusion of law based thereon, of course, falls to the ground.

But if his assumption of fact had been correct, his legal conclusion from such fact would still be wrong, for the following reasons:

First, The *piston*, in its "further traverse," does not *itself* admit train-pipe air to the brake-cylinder; it simply sets in action certain *means* which admit such air, namely, the auxiliary-valve 41 and its by-passage. The specification, by the words "substantially as set forth," makes these means a part of the claim (Seymour vs. Osborne, 11 Wall., 516, 547; Miller vs. Eagle Manufacturing Co., 151 U. S., 186, 202). Indeed, they would have to be read into the claim even in the absence of such words (Mitchell vs. Tilghman, 19 Wall., 391). The claim must always be limited to the means by which the result is effected, and if not so limited in terms or by legal construction it is void. (O'Reilly vs. Morse, 15 How., 62, 119.)

Second, The *specification* of this patent expressly limits the claim to the means by stating that the only invention "claimed" consists in the "*structural features*" (p. 784, line 13) by which the direct admission of train-pipe air to the brake-cylinder is effected, and states that these structural features are composed of the additional valve 41 and its by-passage.

Third, The admissions and erasures made during the prosecution of the application in the Patent Office conclusively limit all the claims to "an auxiliary-valve" (p. 718), and prevent the claims from being construed to cover "a valve integral with the main-valve" for admitting train-pipe air to the brake-cylinder (p. 714).

Fourth, Complainants' counsel, on pp. 40-41 of their brief used in the Circuit Court of Appeals, admit that the "*quick-action attachment* consisting of an air conduit or passage-way directly from the train-pipe connection to the brake-cylinder, and a valve to control it, * * * *is so made the subject matter of every claim in controversy as to give character and effect thereto.*"

We respectfully submit, in view of the authorities above cited and the repeated admissions above referred to, that, whether the "further traverse" were new or old, Judge Morris' construction of claim 2 cannot be sustained.

It is evident from his opinion that Judge Morris has an erroneous conception of the law relating to pioneer inventions, believing that, in some cases, patents for such inventions can be infringed by the use of *functional* equivalents, in the absence of anything like a mechanical equivalent.

This Court has always held the contrary: and the law is so well settled by its repeated decisions that it is difficult to see how anybody can misunderstand it. The very authorities cited by Judge Morris on pages 847, 848 in support of his position are directly against it; and there are many other decisions of this Court on the subject, so clear that misunderstanding would seem impossible. Morse's telegraph was, in the highest sense of the word, a pioneer invention; but, in deciding upon his patent, in *O'Reilly vs. Morse*, 15 How., 62, 119, this Court said:

"Whoever discovers that a certain useful result will be produced, in any art, machine, manufacture, or composition of matter, by the use of certain means, is entitled to a patent for it; provided he specifies the means he uses in a manner so full and exact that any one skilled in the science to which it appertains can, by using the means he specifies, without any addition to, or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes, the patent is void. And if it can be done, then the patent confers on him the exclusive right to use the means he specifies to produce the result or effect he describes, and nothing more. And it makes no difference, in this respect, whether the effect is produced by chemical agency or combination; or by the

"application of discoveries or principles in natural philosophy known or unknown before his invention; or by machinery acting altogether upon mechanical principles. In either case, he must describe the manner and process as above mentioned, and the end it accomplishes. Any one may lawfully accomplish the same end without infringing the patent, if he uses *means* substantially different from those described."

And the Court held Morse's eighth claim to be void, because it did not specify the means by which the described result was accomplished.

In the recent case of *Miller vs. Eagle Mfg. Co.*, 151 U. S., 186, 201, this Court said:

"It is not the result, effect, or purpose to be accomplished which constitutes invention, or entitles a party to a patent, but the *mechanical means* or instrumentalities by which the object sought is to be attained. . . . Patents cover the means employed to effect results."

See also 2 Robinson on Patents, Sec. 518.

Rosseau vs. Peck, 66 F. R., 759.

Wicke vs. Ostrum, 103 U. S., 461, 469.

Electric Signal Co. vs. Hall Signal Co., 114 U. S., 87.

White vs. Dunbar, 119 U. S., 47.

Wollensak vs. Sargeant, 151 U. S., 221.

Knapp vs. Morse, 150 U. S., 221.

Burr vs. Duryea, 1 Wall., 531.

In citing *McCormick vs. Talcott*, *Machine Co. vs. Murphy*, *Valve Co. vs. Valve Co.*, and *Morley vs. Lancaster*, in support of his position on this question, Judge Morris overlooked the fact that this Court, in all those pioneer cases, expressly emphasized the *means as vital* to the question of infringement. Its language is—

"Operating on the same principle and performing the same functions by analogous *means*" (*McCormick vs. Talcott*, p. 405); "at the result, as well as at the *means* by which the result is attained" (*Machine Co. vs. Murphy*, p. 125); "in the Defendant's valve Complaints' exhibit A, the same effects in operation are produced as in the Richardson valve, by the *means* described in Richardson's claim" (*Valve Co. vs. Valve*

"Co., p. 177); "all subsequent machines which employ substantially the same *means* to accomplish the same results are infringements" (Morley vs. Lancaster, p. 273.)

The true rule is that laid down by this court, in Miller vs. Eagle Mfg. Co., 151 U. S., page 207, in the following words:

"The range of equivalents depends upon the extent and nature of the invention. If the invention is broad in its character, the range of equivalents will be correspondingly broad, under the liberal construction which the courts give to such inventions. The doctrine was well stated in Morley Machine Co., vs. Lancaster, 129 U. S., 263, 273, where it is said: 'Where an invention is one of a primary character and the mechanical functions performed by the machine are, as a whole, entirely new, all subsequent machines which employ *substantially the same means* to accomplish the same result are infringements, although the subsequent machine may contain improvements in the separate mechanisms which go to make up the machine.'

Tested by this rule, the patent in suit 360,070 was pioneer *as to the auxiliary-valve 41 and its by-passage*, covering them and their mechanical equivalents, in whatever form they may be used. Westinghouse invented what the Complainants' counsel and the Circuit Court of Appeals for the Fourth Circuit call his "new machine," which he combined with the old triple-valve machine, making two machines combined in one structure; and his range of equivalents is confined to combinations containing his new machine combined with the old well-known machine. If that combination exist in the alleged infringing device, then infringement is established, even though the form of the "new machine" element may be considerably varied from that shown in his patent. But the "new machine" element must be present, in some form or other, or else there is no infringement.

In the New York case, Judge Lacombe properly held the New York Air-Brake Co. guilty of infringement because it used the new machine, the auxiliary-valve 41 and its by-passage, and only varied their form. (See N. Y. device, p. 34, this Brief).

Here, however, the Defendants use the main-valve of the

old triple-valve machine to accomplish the same result *without the presence of the new machine* of the patent in any form whatever; and no court has ever found infringement under such circumstances. To do so would be to discard the whole doctrine of mechanical equivalents and hold that a man can patent results or effects, without regard to the means employed for accomplishing them.

The Circuit Court of Appeals for the Fourth Circuit was right, both as to the facts and the law—*holding*, that the further traverse of the piston was old and usual in triple-valves like those of patent 220,556 (pp. 872, 879, 880); that the Boyden valve 22 is the main-valve of his triple valve, and is not the Westinghouse valve 41 (pp. 881–882); that patents cover only the *means*, or their mechanical equivalents for producing the result, and not the result itself (p. 882); that Boyden's quick-action device is not the mechanical equivalent of that of Westinghouse, but "they * * * differ as widely from each other as two devices for accomplishing the same result can well differ," (p. 880); that prior to the patent in suit Westinghouse had already, in patent 217,838, disclosed the principle of quickening the serial or successive application of the brakes on the several cars by venting the train-pipe at each car (p. 872); that the Court's duty to the public and to inventors at large forbids it to restore to the claim of Westinghouse the matters *which he had erased or virtually disclaimed* at the Patent Office (p. 881), and that the Defendants' device infringes none of the claims of patent 360,070 when the latter are properly construed.

We submit that the conclusion arrived at by the Circuit Court of Appeals is simply impregnable.

We call attention to the fact that Judge Morris and the Circuit Court of Appeals entirely agree on the following points, to wit: That the Boyden valve 22 is the main-valve and not the auxiliary-valve 41 or its mechanical equivalent, and that Boyden accomplishes "quick-action" not by an auxiliary-valve and by-passage, but (p. 845) "by an ingenious arrangement restricting the admission of auxiliary-reservoir air to the triple-valve chamber;" that is to say, by the "partition 9" and the proper proportioning of the old air-passages.

THE DEFENDANTS' DEVICE BROADLY PATENTED TO BOYDEN.

Another consideration of great weight remains to be noticed. The Defendants' device was broadly patented to Mr. Boyden August 16, 1892, *not as an improvement on the Westinghouse device*, but as a new and different means for accomplishing the same result, *operating on a new principle and by a new and different mode of operation*. In the specification of this patent No. 481,134 (applied for September 30, 1889, before this suit was brought), the patent says (p. 1307):

"Efforts have heretofore been made to combine with a
"triple-valve certain *additional* mechanism by which
"train-pipe air could be introduced directly into the
"brake-cylinder in effecting the application of the brakes
"for emergency stops; but in every such instance a sup-
"plemental passage or passages, together with a supple-
"mentary or auxiliary-valve, has had to be employed in
"connection with the triple-valve proper, in order that
"the ordinary functions of the triple-valve might be pre-
"served and the additional function of introducing train-
"pipe air into the brake-cylinder for emergency stops
"might be combined therewith.

"An example of the class of valves referred to in the
"last preceding paragraph *which employ an auxiliary-*
"*valve*, combined with an ordinary triple-valve, is shown
"in United States Patent, to George Westinghouse, Jr.
"dated March 29, 1887, No. 360,070.

"It will be seen that my present invention for intro-
"ducing train-pipe air into the brake-cylinder for emer-
"gency stops *differs essentially* from the device shown in
"the said patent No. 360,070, because I have provided a
"*new principle* of construction and a *new mode* of opera-
"tion, by use of which the desired result aforesaid may
"be produced *without the aid of the auxiliary-valve*
"*heretofore required for the purpose*.

"An examination of the particular embodiment of the
"present invention will disclose the fact that it is a
"triple-valve *per se*, without auxiliary or supplemental
"valve devices, and, further, that its conversion into a
"quick-action valve and its greater capacity for action

“over ordinary forms of triple valves *is due to means which I have invented for retarding or restricting the flow of auxiliary-reservoir air to the main port or passage leading to the brake-cylinder as compared with the more open or free delivery of train-pipe air to the said main port or passage.* * * * And, further, *a single valve—the main valve of the triple-valve proper—is here made to perform the office of opening communication to the brake-cylinder from both the train-pipe and the auxiliary-reservoir in the quick application of the brakes for emergency stops. My invention, therefore, includes any form or structure of valve wherein a single valve admits both train-pipe air and auxiliary-reservoir air to the brake-cylinder in applying for emergency stops, and which structure is provided with means for restricting or retarding the flow of auxiliary-reservoir air to the brake-cylinder as compared with the flow of the train-pipe air thereto.*”

The experienced experts of the Patent Office recognized these statements to be true; and the Commissioner of Patents officially endorsed them as true by granting the patent which contains them, with broad generic claims for Mr. Boyden's new quick-action device—thus adjudicating its entire independence of the Westinghouse device, and holding it to be for a different principle and mode of operation. This action officially puts the Westinghouse patent and the Boyden patent on the same plane with respect to originality and novelty, and in totally different categories as respects the nature of their inventions.

This Court has repeatedly held that such a patent, granted to the later inventor, not as an improvement upon the device of the earlier inventor, but as a new and different way of accomplishing the same result, is evidence of novelty and of non-infringement.

“Consequently such a patent may be, and generally is, received as *prima facie* evidence of the truth of the facts asserted in it. And in cases where the evidence is nicely balanced, it may have weight with a jury in making up their decision as to the Plaintiff's right; and if so, it is not easy to perceive why the Defendant who uses a patented machine should not have the benefit of a like presumption in his favor, arising from a like

“investigation of the originality of his invention, and
 “the judgment of the public officers, that his machine
 “new, and not an infringement of the patent previously
 “granted to the Plaintiff. * * * * The parties should
 “contend on an equal field, and be allowed to use the
 “same weapons.

“The judgment of the Circuit Court is, therefore, reversed,
 “and a *venire de novo* awarded.”

Corning vs. Burden, 15 How., 251, 271.

See also, Miller vs. Eagle Mfg. Co., 151 U. S., 186, 200.

Boyd vs. Tool Co., 15 Sup. Ct. Reporter, 837.

Pavement Co. vs. Elizabeth, 4 Fisher, 189.

Ransome vs. Hyatt, 69 Fed. Rep., 148, 149.

3 Robinson on Pats., p. 243, Sec. 1016.

CONCLUSION.

In view of the matters herein referred to, we do not see how it is possible for any court to reach the conclusion that the Defendants' device infringes any claim of the patent in suit.

We do not desire in any way to belittle the invention of Mr. Westinghouse. While it did not solve the problem of preventing “shocks,” it did contribute to the art a new and important factor which proved to be indispensable to the successful formation of a quick-action device subsequently invented by Mr. Westinghouse. We entirely agree with Judge Lacombe (16 C. C. 371) and the Circuit Court of Appeals of the Second Circuit that the devices of patents 360,070 and 376,837—one the auxiliary-valve and the other the supplemental piston—appear to be both essential to the structure of a quick-action air-brake embodying the Westinghouse principle or mode of operation.

For the purpose of the argument on the question of infringement we, therefore, concede the validity of patent 360,070 and the importance and value of the invention which it describes.

But there are two different and independent ways of producing quick-action—The one, by adding to the old triple-valve a new auxiliary-valve and by-passage; the other, by peculiarly differentiating the air pressures which bear upon the old triple-valve. Mr. Westinghouse has broadly patented the former, and Mr. Boyden the latter. There is nothing in common between these two ways of accomplishing the result except the old triple-valve, and that is not patentable to either party.

The invention of Mr. Westinghouse just as clearly excludes the Boyden idea, as the invention of Mr. Boyden excludes the idea of Mr. Westinghouse. The patents of Mr. Westinghouse and Mr. Boyden are *both* generic, primary, or pioneer patents each in its own way, and there is no conflict between them. Together, they cover the whole field; separately, each leaves half of the field unoccupied.

Respectfully submitted,

LYSANDER HILL,

Counsel for Defendants.

NOTE.—The attention of the Court is called to a supplemental Brief, by associate counsel, in behalf of Defendants.

17-503 4-26
Supreme Court of the United States.

October Term, 1896. Nos. 403 and 426.

Filed Oct. 22, 1896.

BOYDEN POWER BRAKE COMPANY

GEORGE A. BOYDEN, President.
CHARLES B. MANN, Secretary.
WILLIAM WHITRIDGE, Treasurer.

AND

BOYDEN BRAKE COMPANY,

Appellants.

APPEAL.

VS.

GEORGE WESTINGHOUSE, JR.

AND

THE WESTINGHOUSE AIR-BRAKE CO.

Appellees.

GEORGE WESTINGHOUSE, JR.

AND

THE WESTINGHOUSE AIR-BRAKE CO.

Appellants.

VS.

BOYDEN POWER BRAKE COMPANY.

GEORGE A. BOYDEN, President.
CHARLES B. MANN, Secretary.
WILLIAM WHITRIDGE, Treasurer.

AND

BOYDEN BRAKE COMPANY,

Appellees.

CROSS-APPEAL.

ADDITIONAL BRIEF OF ARGUMENT,
FOR BOYDEN BRAKE CO.

HECTOR T. FENTON,
Of Counsel for the Boyden Brake Co.

Supreme Court of the United States.

October Term, 1896. Nos. 403 and 426.

BOYDEN BRAKE Co., <i>et al.</i> ,	}	<i>Appellants,</i>		
vs.				
THE WESTINGHOUSE AIR-BRAKE Co., <i>et al.</i> ,				
		<i>Appellees.</i>	}	<i>Appeal.</i>

THE WESTINGHOUSE AIR-BRAKE Co., <i>et al.</i> ,	}	<i>Appellants,</i>		
vs.				
BOYDEN BRAKE Co., <i>et al.</i> ,				
		<i>Appellees.</i>	}	<i>Cross-Appeal.</i>

ARGUMENT FOR THE BOYDEN BRAKE CO.

Notwithstanding the presumption, arising from the voluminous character of the record, that the questions involved are complex, difficult and unusual; and from the inaccurate and misleading allegations in the Westinghouse Company's petition for the writ of *certiorari*, that the decision of the Court of Appeals in the Fourth Circuit, on these appeals, conflicts with a prior decision of the Appellate Court in the Second Circuit, on the same question, we confidently submit, and shall endeavor to clearly demonstrate, by a comparative examination of the opinions of the appellate tribunals in the Second and Fourth Circuits respectively, and by a concise statement of the controlling

facts governing the decision in the case at bar, that not only is there no conflict nor even a semblance of a conflict between the decisions of the appellate tribunals in the two circuits, on any question adjudicated by either, but in the case at bar there was a single issue involved, *i. e.*, infringement, which was dependent for its solution solely upon whether or not the respective machines of the plaintiff and defendant were alike in principle of construction and operation, or were radically different *quoad* the matters described and claimed as new in the plaintiff's patent in suit. In other words, the questions involved in the case were of the simplest character, the single issue being an issue of fact, *i. e.*, the identity or non-identity of the two machines. True, the determination of this issue of fact is dependent upon the construction to be given to the claim, but that is so in every case.

There was no effort made or argument advanced by the Boyden Brake Co. in the Court of Appeals to dispute, qualify or limit the scope or effect of the decisions in the Second Circuit as *res judicata* on the construction of the claims, but, on the contrary, we relied upon and urged upon the Appellate Court in the Fourth Circuit that the construction and interpretation of the plaintiff's patent, and especially of claim 2 thereof, by Judge Lacombe (65 Fed. Rep. 99, affirmed on appeal), was correct, and that, if accepted as correct and followed by the Court of Appeals in the Fourth Circuit, it required that the latter tribunal should reverse the decree entered by the Circuit Court in the case at bar, which construed the claim 2 aforesaid very differently and inconsistently with the construction given to it in the Second Circuit.

It is proposed in this brief to consider:

I. What was decided in the second and fourth circuits respectively, to determine whether or not there is any conflict between them on the same question.

II. Whether or not there was any error, either of fact or of law, in the decision sought to be reviewed, that in any manner affected or controlled the result,

Before presenting a brief argument on these general questions, it will conduce to a better understanding of the case, if special attention is called to a few leading facts. The bill alleged the grant of a patent to Westinghouse No. 360,070, dated March 29, 1887, and averred that defendant had made and sold air-brakes embodying mechanism that infringed claims, 1, 2 and 4 of said patent; the defense to which was that the machines of the respective parties differed radically from each other, and were in all essential particulars so dissimilar that it was obvious that there was no infringement of claims 1 and 4, and none of claim 2 if the latter was properly construed. The peculiar phraseology of that single claim gave rise to the only really debatable or disputable question in the case.

After hearing on pleadings and proofs, the Circuit Court dismissed the bill as respects claims 1 and 4 on its finding of *fact* that the defendants' device did not contain the mechanisms expressly referred to in said claims and hence did not infringe such claims, but it adjudged in favor of the plaintiffs as respects claim 2 on the theory that although the devices were not structurally the same, but widely different in means employed, they were *functionally* identical; in other words, the learned Judge (Morris, J.) found, as clearly stated in his opinion, that although the Westinghouse *invention* described in the body of the specification was necessarily inclusive of certain characteristic elements, which he did *not* find in the defendants' device either in the same or in any substantially similar or equivalent form, yet (the Court said) the claim was not *in terms* restricted to means, but referred only to the *function* performed, hence he held that it was proper to compare the devices (and he did so compare them) by their functions or results and not by their respective means employed to perform these functions and produce these results. (Hence the remarks found in the opinion of the Court of Appeals on the invalidity of functional claims.) This ruling by the Circuit Court was so obviously contrary to settled doctrine, and erroneous, that defendants appealed from the decision adjudging them to have infringed said 2nd claim; to offset which plaintiffs prayed a cross-appeal for the refusal to sustain their bill as to claims 1 and 4.

Sufficient appears from a comparative reading of the decisions of the Circuit Court and of the Circuit Court of Appeals, in the case at bar, aided by a reference to the colored diagrams annexed to the opinion of the Circuit Court of Appeals, to show conclusively that *both* courts decided that the defendants' device was not only structurally different from, but was not the same in principle of construction and operation, as the Westinghouse patented device; in that the former contained no auxiliary-valve device independent of the main triple valve nor the necessary adjunct in such device of a separate and direct passage way from the train-pipe to the brake-cylinder; hence (as these elements were expressed in the 1st and 4th claims) there was obviously no infringement of those claims. Both courts were in perfect accord on this finding of fact, and the Plaintiff has utterly failed to point out any error in such finding; neither has it been able to point out any error in the finding of either court as to what constitutes the invention disclosed in the Westinghouse patent, even assuming it to be a pioneer patent and entitled to the broadest possible construction. The sole material difference of opinion between the Circuit Court and the Circuit Court of Appeals, and because of which the former was reversed, was in that the former construed the 2d claim more broadly than was warranted by its finding of what constituted the invention disclosed in the body of the specification; and hence was necessarily compelled to compare the devices of the parties litigant by their functions and not by the mechanical means employed, because it found as a fact that such mechanical means were widely different. No one can read the opinion of the Circuit Court without being impressed with the belief that had it not erroneously construed said 2d claim, but had construed it to be broadly for means auxiliary to and independent of the main-valve of the triple-valve, actuated "by the (usual) further traverse of the piston" of the triple-valve, (as the *invention* is defined in the patent, as it is defined in the opinion of the Circuit Court of Appeals, complained of, and as it is defined in the opinion of Judge Lacombe in the Second Circuit, 65 Fed. Rep. 99), the Circuit Court for the District of Maryland would have held *as a fact* that the defendants' device in the case at bar did not involve such invention or its elements or anything substantially equivalent thereto, and hence did not infringe said *second* claim.

It will lighten the labor of investigation by this Court if we refer to the petition for the writ of certiorari, filed by the Westinghouse Company, to ascertain in what particulars they deem the decision of the Court of Appeals to be erroneous.

Their allegations are: That there was a prior adjudication in the Second Circuit (65 Fed. Rep., 99), in which claim 2 of this patent was adjudged to be valid. That in the case at bar the Circuit Court of Appeals for the Fourth Circuit "has adjudged and declared that said second claim is invalid and does not cover subject matter which can be lawfully claimed;" and hence, that there is a conflict of decision on the same question.

It is respectfully submitted that the Court of Appeals has not so decided, and that the decision has evidently been misunderstood or misinterpreted by the petitioners; the adjudication being in effect that if claim 2 is to be construed (as the Circuit Court held and applied it) for a function or result irrespective of the means employed to perform such function or produce such result, it is "fatally defective," but the following paragraphs of the opinion clearly show that the Court construed it by implying the means, by force of the concluding words, "substantially as described;" and, hence, reversing the Circuit Court on its finding of law, in the construction of the claim, affirmed it on its finding of fact that the plaintiffs' machine as so defined, was neither the same as, nor substantially similar to, the defendant's machine either in principle of construction or in mode of operation. In the petition it is said—paragraph 13—that said second claim is of great value and importance. A reference to Judge Lacombe's opinion in the Second Circuit (65 Fed. Rep., 99) will show that it is of comparatively minor importance, and merely inclusive of a modified form of the device covered by the first and principal claim.

It is said in the petition page 6, that "the invention of the patent in suit, No. 360,070, is one which is used on upwards of 400,000 freight cars at the present time," etc. As this paragraph was evidently inserted for the purpose of impressing this Court with the belief that the subject matter of this litigation was of sufficient value and importance to warrant this Court in reviewing it on that ground alone, it is proper to reply to said statement by the remark that the same is wholly incorrect and misleading. What the petitioners meant to say or ought to have

said, is that the device of the later patent, No. 376,837, referred to in the 9th and 10th paragraphs of the petition (which said patent is for an operative and highly useful and successful improved quick-action brake embodying some of the features and principles of their earlier patent, No. 360,070,) is so "used on upwards of 400,000 freight cars at the present time," because it was proven in the case in the 2d Circuit and also in the present case in the 4th Circuit, that the device of the patent here in question is not now made by the petitioners and has not been made or sold by them since 1887 when they adopted the device of the later patent, No. 376,837, as their standard form. The defendants alleged that the manufacture and sale of No. 360,070 was abandoned by the petitioners because of its radical defects; on the other hand the petitioners allege that it is not defective, but that the later device is better for their purpose. We leave the Court to draw its own conclusion on this point; (which, however, is not material in the present inquiry) from the remarks of Judges Townsend and Shipman on that question (65 Fed. Rep. 99 and 69 Fed. Rep. 715) and Record, page 149, Ans. to X-Qs. 163 to 167.

These two New York cases are also instructive in showing what view the court and the plaintiffs in those cases entertained and enforced as to the utility and scope of the invention of patent 360,070, which was *not* in suit therein, but was set up by the defendants therein as anticipating and qualifying the later patent—376,837—on which said case was founded. After the decisions in said case the plaintiffs brought a suit on both patents, including 360,070, the opinion in which, on motion for preliminary injunction, was written by Judge Lacombe and is reported—65 Fed. Rep., 99. That case was founded on both patents, Nos. 360,070, March 28, 1887, and 376,837 dated January 24, 1888.

It is to be noted that of these patents, the second one, No. 376,837, is the *only* one that had *then* been favorably adjudicated.

Each of the aforesaid patents are for "auxiliary-valves" *additional* to the triple-valve, and operating to open *independent* ports and *passage-ways* leading directly to the brake-cylinder. In 360,070 the auxiliary-valve is opened by means of the triple-valve piston acting *mechanically* on it (as both the

New York courts said of it.) In 376,837 the auxiliary-valve is opened by auxiliary-reservoir air pressure acting on a supplemental piston, and not mechanically by the triple-valve piston. (See Rec., page 153, X-Q. and Ans. 182.)

It will be seen that in both of these Westinghouse patents train-pipe air is admitted to the brake-cylinder through an *independent* passage controlled by an "auxiliary-valve" *additional* to the "triple-valve"—the difference between these patents is merely that each has its own specific means to open the said "auxiliary valve."

In order to a proper understanding of exactly what the decision complained of determines as adjudicated matters of law and fact, we may best reach a correct conclusion by inquiring (a) what in general terms is the invention patented; (b) what in general terms is the device of the defendant alleged to infringe; (c) why the Circuit Court, as well as the Court of Appeals, held that the latter was not substantially similar to the former in respect of the matter of claims 1 and 4 as to which the bill was dismissed in the first instance; (d) what construction of claim 2 was proper and allowable under the broadest interpretation that could be given to it in view of the descriptive matter in the specification and the file and contents of the application; (e) that the construction so given to it was entirely consistent with, and, indeed, exactly the same as given to it by the courts in the Second Circuit; and (f) that, although under the *same* construction of claim 2 by the appellate tribunals in the Second and Fourth Circuits, respectively, the device of one defendant was adjudged to infringe, while the device of the other was held not to infringe, this result was not due to any conflict or contrariety of decision between the two courts *as to the proper interpretation of the claim*, but was due solely to the fact that the respective devices of the two defendants were totally different from each other, in that while the Boyden Brake Co.'s device did not contain the invention of the second or any other claim of the Westinghouse patent, as the said claims were defined by either the Courts of Appeals in the Second or the Fourth Circuit, the device of the defendant in the Second Circuit *did* contain the invention as so defined in *all* the claims. Hence, the alleged variance is not a conflict of decisions, as to a question of law or the construction of the claim, but a difference of finding,

and a proper difference of finding, of *fact*, on the issue of infringement only in the two cases, respectively; and necessarily so because in the one case the Westinghouse invention was compared with a device substantially identical with it, while in the other case it was compared (under the same interpretation of the claims) with a device which was totally different from it.

And this difference between the devices of the respective defendants in the two cases will be apparent at once on a comparison of the colored diagrams of the said devices annexed to the opinion complained of, in connection with the opinion of the Circuit Court and the Circuit Court of Appeals for the Fourth Circuit defining the Boyden Brake Co.'s device (Proceedings, page 877), and of the Circuit Court (Lacombe, J.) defining the New York Air Brake Co.'s device (opposite page 883).

A BRIEF COMPARATIVE EXAMINATION OF THE PLAINTIFF'S AND DEFENDANTS' MACHINES.

The marked differences in principle of construction and operation between the Plaintiffs' and Defendants' machines respectively, should be clearly understood, and when so understood the propriety and correctness of the decision of the Circuit Court of Appeals for the Fourth Circuit will be apparent at once.

COMPLAINANT'S MACHINE.

By reference to the Plaintiffs' patent, and to the several decisions explaining and defining the invention, both in the Second and Fourth Circuits (which are entirely in accord on this subject), we find that it consists of a brake device, having for its foundation or principal element in the new combination, a triple-valve device such as is described in the old and expired Westinghouse patent No. 220,556. This device operated to admit air pressure to the brake-cylinder solely from the auxiliary-reservoir. To this device, as so constructed and operated, AND WITHOUT CHANGE THEREIN, EITHER IN ITS PARTS OR IN THE MODE OF OPERATION OF ITS PARTS, or in any of the triple-valve functions performed thereby, the patentee of 360,070 (the patent in suit) *added* two elements, viz., an auxiliary-valve (marked 41) and a passageway (marked 46) controlled thereby. This valve 41 was purely *auxiliary*, both in mechanical construction and mechanical operation; hence (as stated in the patent) it was *independ-*

ent of the main valve, and could be plugged up without in any manner affecting the action of the triple-valve, or any of its parts or passages. This valve 41 and passage 46 are shown in the red coloring on the diagram (proceeding page 877) annexed to the opinion of Judge Hughes in the Court of Appeals, and are thus brought out clearly so as to be sufficiently understood. Indeed, so distinct and segregable are the new *added* parts from the old triple valve parts of patent 220,556 that the Counsel for petitioners, in their briefs in the Circuit and Appellate Courts, described the new device as *two* machines enclosed in one case or box, the new part (or machine) being brought into action by the old under certain conditions.

The exact language of the statements referred to, in the Westinghouse brief, is as follows :

"Westinghouse added to and combined with the brake
 "(the automatic brake of the prior patents, Nos. 220,556)
 "another brake mechanism. * * * And he so com-
 "bined these two mechanisms, "the service" and the
 "quick-action," that while, in fact, they constitute *two*
 "*machines*, they are also included in a *single structure*.
 "(The italics are in the original.)"

And again :

"Thus it will be seen that this quick-action attach-
 "ment, *consisting of an air conduit or passage-way*
 "*directly from the train-pipe connection to the brake-*
 "*cylinder, and a valve to control it*, such valve itself be-
 "ing under control of the triple-piston and so combined
 "with the old automatic brake appliances that not inter-
 "fering with the ordinary use of the latter it, the quick-
 "action attachment, may be used as an auxiliary emer-
 "gency device in the presence of great or serious danger—
 "that *this*, the chief novelty and element of utility of
 "the Westinghouse invention now in controversy is so
 "made the subject of *every claim in controversy* as to
 "give character and effect thereto, etc. (The italics are
 "*not* in the original.)"

The counsel, in the foregoing statements, undoubtedly made a correct exposition, both as to the character of the apparatus patented by Westinghouse and the scope of the claims therefor. We do not dispute either proposition, because it accords exactly with the patentees statement contained in the Patent, in which after elaborately describing the prior automatic brake (of patents 220,556 and others), he says :

"So far as hereinbefore described, the triple-valve "accords in all substantial particulars with, and is "adapted to operate similarly to those of my letters "patent Nos. 168,359, 172,064 and 220,556, and in order "that it may perform the further functions requisite in "the practice of my present invention, it is provided with "certain *additional members*."

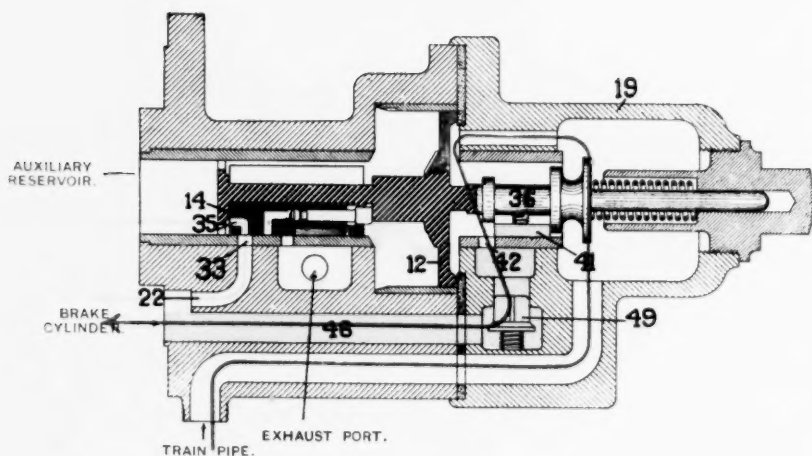
He then proceeds to tell us in plain English words that do not admit of doubtful meaning, that these *additional members*, consist of "an auxiliary-valve, 41 (which) is connected to and moves with the stem, 36, said valve working over a face on the bushing, 37, between the piston chamber, 11, and drain cup 19 and governing a port, 42, in said face leading into a chamber, 43, adjoining the same."

Opposite is a diagram of the patented device, taken from the patent drawing, the new parts being colored in red to show quickly to the eye exactly what are the "additional members" and what is the relation they bear to the old parts—the triple-valve proper. In its operation the course of the auxiliary-reservoir air through the old main-valve (*black*) of the triple-valve is shown by a yellow line, and the course of the train-pipe air through the new "auxiliary-valve" device is shown by a blue line. Thus in the Complainant's structure, *two* machines are required to perform the two functions.

Now, how are the *auxiliary-valve* 41 and passage 46 constructed? what relation do they bear to the triple-valve device? how are they combined therewith? whether they may be integral therewith or must they be segregated therefrom? and how is the auxiliary-valve actuated, or rather *governed*, by the old device to which they are *added*? This is the key to a correct understanding of the invention of the new combination patented. Everybody agrees that, as shown and described, the *new* parts are physically distinct and separate from the *old* parts, to which they were added and are operated by the *usual* further or extreme traverse of the triple-valve piston (of the old 220,556 device), the stem thereof striking the valve 41 (colored red) on such further or extreme traverse and unseating it, hence uncovering the passage 46 (colored red), which leads from the train-pipe *direct* (and not through any port passage or chamber of the old triple-valve element), train-pipe air will pass directly to the brake-cylinder.

Complainants Structure of Patent 360,070

With the Valves in the Quick-Action Position.



The course of the Auxiliary Reservoir Air through the old Main Valve (black) of the Triple Valve is shown by a yellow line, and the course of the Train Pipe Air through the new "Auxiliary Valve" device is shown by a blue line. Thus in the Complainants structure, *two* machines are required to perform the two functions.

In the light of the evidence presented by this record, how can the patent in suit be classified or treated as a pioneer patent? Both in its general and in its particular descriptions the invention is referred to in the patent as consisting of a novel combination of mechanisms, the major portion of which is admittedly old. We were told by the learned counsel for the complainant, in their printed briefs in the Circuit and Appellate Courts, and truthfully told, that the invention in question consists really of two machines in one—two separate and distinct machines—the new element wholly separate and distinct, both functionally and physically from the main (the triple-valve) mechanism. Not a single one of its elements is connected, physically or otherwise (except that they are both in the same casing) with the main machine; not a single element of it plays any part in the performance of the work of the main machine, nor do they alter, add to, affect or vary in the most remote manner the function or operation or result of the main machine as a triple-valve proper. The latter remains in this new combination, as an element thereof, with the *same* mode of operation as it always had, precisely as it is described in the previous expired patent, No. 220,556, granted to Westinghouse. In other words, the present invention is built upon the triple-valve of this prior patent, without any change whatever in *its* construction or in the mode of operation of any of its parts. In the words of the patent in suit, the invention consists of the old triple-valve of patent 220,556, “provided with certain *additional* members,” which the specification shows are auxiliary thereto, but mechanically independent therefrom, in order that these additional members may be actuated by the other and old element under certain conditions—*i. e.*, when its piston makes its old “further” or full traverse and so contacts with and moves the valve of the added machine, which produces an additional function.

Now, what is this additional function, and what is the new result obtained or sought to be obtained? The former is described generally as the admission of train-pipe air direct to the brake-cylinder; and the latter as quickening the action of the brake, as the chief object. Let us see what is the effect of the admission of the train-pipe air direct to the brake-cylinder. It is certainly not a quickening of the action of the valve itself.

The triple-valve of patent 220,556 is undeniably as quick in action—as a single valve—as the machine of the patent in suit. What is meant by “quick action” is quick *serial* action of a number of such valves placed in sequence under the cars of a train; and this quickening of action is effected because the discharge of train-pipe air *at each valve* hastens the action of the succeeding valve; in other words the train-pipe is vented *at each valve*, instead of (as in the old automatic brake) at the one opening, at the engineer’s valve on the engine. But did the patent in suit, for the *first* time, disclose this underlying principle of quick action or quick serial action? Assuredly not; as the record clearly shows (page 666).

It is fully contained in an earlier patent, No. 217,833, dated July 22, 1879, granted to Mr. Westinghouse, in which he said (p. 759):

“It sometimes happens with such brake apparatus, especially in case of accident, that material advantages could be effected by having all the brakes of the train applied or brought into action *simultaneously*, or *nearly* so as possible. To accomplish this it is only necessary to make provision for the simultaneous opening of one or more ports in the air-conduit passages at points not remote from each auxiliary-reservoir.”

And this description in the patent follows a reference to the applicability of that principle and that invention to the triple-valve or automatic brake. Now, this fact is of prime importance because, while this old patent does not, nor do we pretend that it does, disclose the *mechanism* of the patent in suit, it does disclose the principle of serial venting of the train-pipe at each car, which underlies and characterizes the invention of the patent in suit, and deprives it of all semblance of right to be classified as a pioneer patent for quick serial action.

It is very important that your Honors should give due weight to this evidence of the condition or prior *state of the art*, because it affects, to a certain extent, *the range of equivalents* to which the patent in suit may be entitled. And the condition of the art, disclosed by this prior patent, No. 217,833, as well as by the triple-valve patent, No. 220,556, lies at the very threshold of the enquiry in this, as in all other cases, as to what is legally included within the claims, wholly apart from and in addition to the descriptive limitations in the body of the specification of the patent in suit.

No one can read the specification of the patent in suit, without reaching the conclusion that the *essence* of the invention consists (as admitted by counsel in the extracts above quoted from their Circuit and Appellate Court briefs) in combining *two separate and distinct* machines, one old and the other new, the latter in no manner a part of the old device, mechanically or functionally.

DEFENDANT'S MACHINE.
(See diagram opposite following page.)

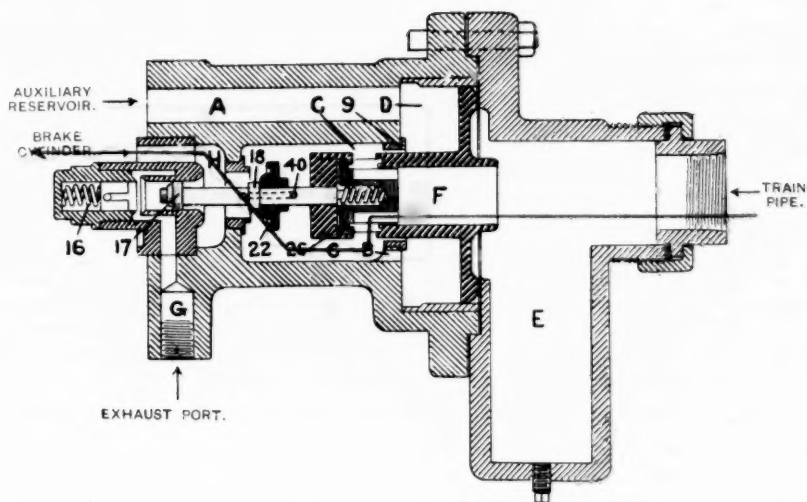
On the other hand, the defendants machine does not consist of two machines combined, but of one machine, and that the old one, improved and improved in a part which never before, by any one in the world, was ever thought could be improved or modified, viz. by separating the triple-valve chamber into two chambers communicating with each other through a small opening; in plain words, inserting a *bushing or partition* therein and so producing *differential pressures* in the chambers C and D on either side of said partition, thereby having a high pressure in piston chamber D (70 lbs.) to hold the piston back, and a lower pressure in the valve chamber C (about 5 lbs.), thus permitting the train-pipe air (shown by a blue line) at 55 lbs.) to open the feeding-in valve of the triple-valve, and passing into the chamber C, therein commingling with auxiliary-reservoir air (shown by a yellow line), and *both* airs passing together to the brake-cylinder, through the port opened by the *old* main-valve 22 (black) of the original triple-valve. In other words making *one* valve, the said main-valve 22, perform the *two* functions of simultaneously admitting both airs to the brake-cylinder. This was more than an invention; it was a discovery, a revelation of the latent powers of the old machine, made wonderfully effective by the most simple change, and in a part of the device never before attempted to be modified, and which the skill of the mechanic would never suggest to him to alter, add to or modify to produce the effect sought for. The means adopted to produce the primary result obtained, *i. e.*, differential pressures, producing the desired secondary effect, could never be *reasoned* out from anything then known in the art; certainly not from anything contained in the plaintiffs' patent. It was a great invention, and the widest possible departure from the principle on which 360,070 is constructed, wherein *two* (the old and a new) machines are required,

Opposite is a diagram of the defendants' device. In its operation, the course of the auxiliary-reservoir air, through the port opened by the old main valve 22 (black) of the triple-valve, to the brake-cylinder, is shown by a yellow line, and the course of the train-pipe air, commingling with the auxiliary-reservoir air and passing together through the same old main-valve port, to the brake-cylinder, is shown by a blue line, thereby utilizing the old main-valve 22 of the triple-valve to perform both functions. Thus in defendants' structure only *one* machine, the old triple-valve, is required to perform the two functions.

Let us critically examine it. We have seen that Westinghouse started with the old triple-valve and *added* new valve parts, forming a second machine, which are physically segregated from the old, and only brought into action when (under a great release of pressure in the train-pipe) the movable part (the piston) of the old makes its *usual* full (further) traverse, which causes it to *contact with* the movable element (the valve 41) of the new or *added* parts. Now, on the other hand, Mr. Boyden also started with the old triple-valve, and desiring to accomplish the same final (secondary with him) *result* as Westinghouse (which he had a perfect right to do if he did it by substantially different *means*), viz., admit train-pipe air as well as reservoir air to the brake-cylinder, he devised entirely novel means to produce that result, not by *adding* any auxiliary-valve nor any additional passage-way controlled thereby, but he utilized *the same passage-way and the same valves* of the old triple-valve to perform the double function, viz: (a) Its old function of admitting reservoir air, and (b), the new function of admitting train-pipe air; and he did this by means of ingeniously partitioning the old triple-valve chamber so as to produce *differential pressures* therein under the conditions required, which said means (the subject of Boyden's patent 481,134) are so obviously different, not only structurally but in principle of construction and operation from that of the Westinghouse device of patent 360,070, that both the Circuit Court for Maryland and the Court of Appeals for the Fourth Circuit unhesitatingly so found *as a fact*. Both courts concurred in finding that claims 1 and 4 of patent 360,070 (which *expressed* the necessary features of that device) were clearly not infringed,

Defendants Structure.

With the Valves in the Quick-Action Position.



The course of the Auxiliary Reservoir Air, through the port opened by the old Main Valve 22 (Black) of the Triple Valve, to the Brake Cylinder, is shown by a yellow line, while the course of the Train Pipe Air, which commingles with the Auxiliary Reservoir Air in the Valve Chamber C and passes through the same port to the Brake Cylinder, is shown by a blue line. Thus in Defendants Structure only *one* machine, the old Triple Valve, is required to perform the two functions.

The Circuit Court says, in its opinion (p. 844):

"In the Boyden mechanism, which is alleged in this case to infringe, I have not been able to satisfy myself that Boyden makes use of an auxiliary-valve in the sense in which the term is employed in the specifications, and some of the claims of the patent No. 360,070 "in suit."

And again he says (p. 844):

"So, I take it, that the defendants' valve i, k, j (40) must "be held to be the *sensitive graduating valve* usual in "triple-valve devices since the Westinghouse patent No. "220,556; and the Defendants' valve 22 must be considered to be the main valve, and that in defendants' "mechanism he has been able, by an ingenious arrangement restricting the admission of auxiliary-reservoir air "to the triple-valve chamber, *to cause the main valve* to "do both main-valve work when needed and to do quick-action work when needed."

The learned judge, having thus found as a *fact* that the Boyden machine did not contain the elements which distinguished and characterized the novelty of the Westinghouse machine, now, why did he hold that Boyden's device infringed the *second claim* of 360,070 (and not the first and fourth), and why did the Court of Appeals for the Fourth Circuit concur with the Circuit Court in its finding of non-infringement of claims 1 and 4 and differ with it as to claim 2 and reverse its finding as to the construction of claim 2 and the issue of infringement based thereon?

The answer is very easily ascertained from the face of the two opinions without searching the record; and upon them we can safely rest a conclusion as to whether or not the decision of the Court of Appeals for the Fourth Circuit, complained of, is correct. That answer is to be found in the following facts; and they show conclusively, not only that the decision of the appellate tribunal was correct, but that it is in full accord with the decisions in the Second Circuit *on the same question, i. e.*, on the construction and interpretation of claim 2. These leading facts are as follows:

1. As before stated, the devices of both parties litigant are founded upon and evolved from, the old triple-valve (shown in prior expired patents). That old device contained a piston which actuated a main-valve; that piston in the device of 220,556 and others had *two* traverses, one a preliminary or partial

traverse for a part of its possible throw, and the other a further or final or continued traverse for the full extent of its possible throw. The *main-valve* of the triple (of 220,556) had as an adjunct a sensitive graduating-valve mounted within it, which was first moved by the partial traverse of the piston and opened a port through the main-valve, for ordinary or "graduated" braking, such partial or preliminary traverse of the piston (whether it was sufficient to move the graduating-valve and the main-valve or the former only) was sufficient to do all the *graduated* work required, *i. e.*, let enough air pressure enter the brake-cylinder; but when full or maximum pressure was *quickly* desired the piston was given its full or further traverse, and the main-valve then included and performed the whole work, which was commonly denominated an "emergency" application of the brakes. This explanation is *essential* to bear in mind, in order to have it clearly understood that the triple-valve piston of the old device of 220,556 had not only a *preliminary traverse*, but a *further traverse*, precisely as it has, and no other than it has, in the improved device of the patent 360,070 here in suit.

With this explanation let us look at the second claim, italicizing it as the Court of Appeals did:

2. In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder and a triple-valve having a piston whose preliminary traverse admits air from the auxiliary-reservoir to the brake cylinder, *and which by a further traverse admits air direct from the main air-pipe to the brake-cylinder*, substantially as set forth.

The Circuit Court obviously construed this claim improperly, for two reasons: (a) because it erroneously, or rather mistakenly, found as a premise that the "further traverse" in and of itself was a new and "unusual" traverse of the piston. It has been clearly shown that it was not new and unusual, but precisely the same "further" traverse that it always had. The claim in question is an exact description of the old automatic brake and the old triple-valve of patent 220,556 (patents for same having expired) in its statement of the elements and in its statement particularly of the preliminary and further traverses of the triple-valve piston (the former for graduating and the latter for emergency service), the said claim stating nothing new quoad the old device of patent 220,556, except the "result" obtained

by such *further* traverse in this new combination, viz: "Admits air *directly* from the *main air-pipe* (train-pipe) to the brake cylinder;" and, as these words were followed by "substantially as set forth," of course some *means* (even generically considered) *of the character described in the specification* were to be read into the claim by implication, as otherwise it would be obviously void as claiming a mere result or function. Now this is exactly what the Court of Appeals did. It found that the Circuit Court was wrong, and confessedly (by reference to prior patent 220,556) obviously wrong, in supposing that the "further traverse" mentioned in the claim was "new and unusual;" and this being so, that if the claim was to be interpreted literally to include a combination comprising no other elements than those named (all of which were old separately and in the same combination and acting as such only in the old way) that the claim, as thus construed, could not be differentiated from the prior art, except by the words "admits air direct from the main air pipe to the brake cylinder," which was clearly claiming a "function" or "result" and not the means, and particularly not the means pointed out in the specification to produce the result named.

But the Court of Appeals did not stop there, nor did it adjudicate that the claim was necessarily to be adjudged invalid and void, or "fatally defective," under any and all possible constructions of it, as mistakenly averred by the Westinghouse Company's counsel in the petition for certiorari.

The Court of Appeals having found, and correctly found, that Judge Morris was in error in supposing that the "further" traverse of the piston, referred to in the claim, was new, there was nothing left in the claim, descriptive of the new parts of the machine, except the words "admits air directly from the main air-pipe to the brake-cylinder," which it is useless for anybody to deny are descriptive only of the "result" sought for, and not of the means to produce that result. The Court of Appeals having thus corrected Judge Morris in his finding of *fact*, in this regard, of course was obliged to reject his standard of comparison of the two machines—i. e., a comparison of them by their functions or results, as a whole, and not by their mechanisms; and proceeded to determine for itself what was the true interpretation of the claim.

In doing so, Judge Hughes is careful to state (which statement would otherwise be wholly unnecessary) that—(p. 877):

“The phrase ‘substantially as set forth’ is technical, and equivalent to saying ‘by the means described in the text of the inventor’s application for letters patent, as illustrated by the drawings, diagrams and models which accompany the application.’ These words limit the general terms of the specification which set out the *function* performed by the invention, and confine the inventor’s rights to his own *means* or their mechanical equivalent of performing the function.”

(The italics are the Court’s and appear in the Opinion.)

Now, having shown that the Circuit Court erred first in its finding of fact that the “further traverse” of the piston, spoken of in the claim, was “new and unusual,” and hence necessarily erred in its construction of the claim based on such mistake in fact, the Court of Appeals proceeded thereupon to show, as stated, that if it construed the claim without any limitations and literally upon what was new in it, it would perforce be obliged to hold the claim fatally defective as covering a result only, because the statement of the result (“admits air directly, etc.”) was the only new thing stated in it, and hence that under such construction it would be acting contrary to settled doctrine if it held the claim to be otherwise than “fatally defective” under such conditions. But it did not make any such *adjudication*, because it proceeded to discuss the effect of the words “substantially as set forth,” holding that “these words limit the general terms which set out the *function* and confine the inventor’s rights to his own *means* or their mechanical equivalent of performing the function.”

Hence the Court of Appeals proceeded to ascertain and determine what were these *means* and to give a broad and general definition thereof, limiting them only by the absolutely necessary limitations inherent in the device itself, and as expressed in the specification. The learned Judge’s “Statement of the Case” preceding the opinion, and the opinion itself, clearly show this to be so. In the former he said (p. 875):

“To repeat, his (Westinghouse) device for this purpose consisted in attaching to the pre-existing triple-valve, as patented in number 220,556, a machine which embraced an additional stem, an additional valve and additional air-passages leading from the port in the

"new valve to the brake-cylinder. This new attachment is put into action for emergency purposes by the triple-valve piston when on its extreme traverse. The previous machine, 220,556, had provided for the extreme traverse of that piston by which it had put in action the main-valve at the end of its old stem, and opened a full and direct flow of compressed air from the auxiliary-reservoir into the brake-cylinder for use in emergencies. Thus the new contrivance, by the same extreme traverse of the triple-valve piston, continued the old flow of compressed air for emergency purposes and provided an additional flow of the air for emergency purposes by an additional mechanism; this latter flow being directly from the train-pipe, and the former flow being from the auxiliary-reservoir. Such was the make-up of patent 360,070—two machines in one box or case."

Preceding the above-quoted paragraph the Court of Appeals took occasion in defining the old triple-valve of 220,556 to say (p. 873):

"With this brake of patent 220,556, gradual stopping and slowing was executed by giving the piston a partial or half-traverse in its chamber, by which air passed through the sensitive-valve on the stem of the piston to the brake-cylinder; and emergency stopping was done by a full or extreme traverse of the piston in its chamber, which closed the sensitive-valve in its stem and opened the main-valve fixed upon the end of the stem, and allowed a full and direct venting of air from the auxiliary-reservoir into the brake-cylinder."

And also remarking in succeeding paragraph the following (p. 874):

"In the Westinghouse Automatic Air-brake, as patented in number 220,556, the ordinary work of braking was performed by a partial traverse of its chamber by triple-valve piston, graduated, according to the purpose desired, at the will of the engineer; and emergency work was done by an extreme traverse of the piston to the end of its chamber. * * * The text and diagram of 220,556 show that even a full or extreme traverse of the piston in its chamber would vent no other compressed air into the brake-cylinders except from the auxiliary-reservoirs."

Having thus defined the prior art (as shown in the patent 220,556), and conclusively established that the Circuit Court was mistaken in saying that the "further traverse" of the piston

was "new and unusual," and having also shown thereby that every element both separately and in the same combination, and their and its mode of operation, *expressed* in the second claim, was old, the learned judge, speaking for the Court of Appeals, proceeding to detail the evolution of the two devices of the Plaintiffs and Defendants herein, said, in the following extract from succeeding paragraphs (p. 874):

"It is admitted on both sides that while the mechanism "220,556, though effective for the ordinary purposes of "braking, was not effective for abruptly stopping long "trains in sudden emergencies. This deficiency of the "Westinghouse brake, in the stage of improvement which "it had reached in patent 220,556, created the necessity "for some additional invention whereby could be accom- "plished an instantaneous and simultaneous application "of all the brakes of every car.

"Each of the chief contestants in the present suit set "himself laudably to work in devising a means to "accomplish this important desideratum, each taking the "air-brake, patented as numbered 220,556, Westing- "house's exclusive property in which has expired, as the "basis of his new device, the common object being to "produce a mechanism by which to secure instantane- "ously, whenever and only when a sudden emergency "arose, such a quickened discharge of compressed air "into the several brake-cylinders that each car would "simultaneously, and the entire train as a whole, be "brought to a sudden halt, but leaving all the mechanism "already existing for use in ordinary braking unmolested "and unchanged. Westinghouse devised for each car an "additional valve, which he so attached to the triple-valve "of patent 220,556 that when the piston should be in "complete traverse and driven to the end of its chamber, "it should drive forward an additional stem provided for "this additional valve, and thereby open a port in that "valve by which compressed air from the train-pipe "should pass, through by-passages independent of the "triple-valve, into the brake-cylinder into which the "triple-valve vented compressed air from the auxiliary- "reservoir. By this device of the additional stem, the "additional valve and the independent by-passages into "which the latter opened, the inventor contrived to dis- "charge compressed air from both the auxiliary-reservoir "and the train-pipe into the brake-cylinder of each car "simultaneously, and thereby so quickened the action of "the brakes as to accomplish the desideratum of quick "action.

"Boyden also made a successful invention of venting compressed air from the train-pipe into the brake-cylinder of each car, simultaneously with venting air from the auxiliary-reservoir to the brake-cylinder, as had been done for emergency purposes by the previous triple-valve of patent 220,556. He did not resort to a second machine. He did not devise an additional stem, an additional valve, or by-passages independent of those of the triple-valve. He accomplished the transmission of compressed air directly from the train-pipe to the brake-cylinder by other means."

The foregoing quotations are from the "statement of the case" preceding and made a part of the opinion proper. In the latter, comparing the Plaintiff's and Defendant's devices, the Court said (p. 878):

"The same result was accomplished by the two devices, but these had but one means in common. Each used one common mechanical movement of the main piston, which was a movement described in the patent which had expired. But the further mechanism employed, respectively, by the two inventions were, respectively, as has been described.

"The transmission of train-pipe air and auxiliary-reservoir air simultaneously to the brake-cylinder is a result or function, and is not patentable. The means by which this or any other result or function is accomplished may be many and various, and if these several means are not mechanical equivalents, each of them is patentable. The question at bar is, whether Boyden's brass-ring partition with the port it contains, inserted in and made a part of the triple-valve itself, successfully accomplishing the function of discharging train-pipe air into the brake-cylinder simultaneously with the triple-valve's discharge of auxiliary-reservoir air into that cylinder, is the mechanical equivalent of Westinghouse's attached machine, non-integral, segregate and individual, consisting of another stem, another valve and by-passages peculiar to itself leading from the additional valve to the brake-cylinder, both devices being put in action by the triple-valve piston when on its old extreme traverse."

Can anything be plainer than that the Court of Appeals *adjudicated*, not that the 2d claim was void if properly construed, but that it should be construed (and properly so) as a claim for the *means* of producing the result stated in the claim? And, so construing it, the Court said (p. 880):

"Comparing the two devices apart from the triple-valve piston in extreme traverse, we are unable to entertain a doubt that the ruling of the Patent Office was correct to the effect that Boyden's device was not the mechanical equivalent of that of Westinghouse. They seem to us to differ as widely from each other as two devices for accomplishing the same result can well differ."

If it had meant to say, and had adjudicated, that the said 2d claim was fatally defective and void, under any permissible interpretation of it (as the plaintiffs mistakenly asserted in their petition for *certiorari*), there would have been no necessity for saying, and indeed it would have been surplusage to say, on the issue of infringement, the matter quoted in the above paragraph.

And this finding of fact by the Court of Appeals differentiating between the two devices in question, and adjudging their non-identity as mechanisms, is in full accord with a like finding of fact in the case at bar, by the Circuit Court, as will appear from the following quotation from the opinion of that Court (p. 844):

"In the Boyden mechanism, which is alleged in this case to infringe, I have not been able to satisfy myself that Boyden makes use of an 'auxiliary-valve' in the sense in which that term is employed in the specification and in some of the claims of the patent No. 360,070, now in suit. It appears from the specification of patent No. 360,070 that what Westinghouse meant by the 'auxiliary-valve, which is made one of the elements of the combination in the first and fourth claims, is such a valve as he has described in his specification, and which is independent of and performs none of the functions of the main valve of the ordinary triple-valve device."

Thus it is demonstrated to an absolute certainty that claim 2, in order to make it a claim for anything but the "result" sought for, i. e., "admits air directly from the main-air-pipe to the brake-cylinder," must be construed by implying the *means* to produce that result, and hence, is inclusive of means which are "auxiliary" to the triple-valve and "independent" of the main valve thereof; and these quoted words are the only limitations which the defendants sought to apply; and they are

required not only by the principle of construction and operation of the device, apparent on the face of the patent itself, but by the matters appearing in the file and contents of the application therefor.

Indeed, the plaintiffs, while now shifting their position, conceded these limitations in the Circuit and Appellate Courts, in the extracts already quoted herein from their brief in those Courts. (See quotation page 9 of this argument).

In corroboration of its conclusion stated, the Court of Appeals took occasion to remark that the decision of the Patent Office in granting a patent (No. 481,134) to defendant (Boyden) for his device was corroborative evidence of the non-identity of the device of the Defendant with that of the Plaintiff. The Court was very careful to say that this was only evidence, and was not conclusive. For the purpose of proving non-identity the Defendants' patent was admissible as evidence, and properly considered as such, in view of the decisions of this Court in *Corning vs. Burden*, 15 Howard, 252, and *Miller vs. Eagle Co.*, 151 U. S. 186 (208), in which latter case this Court said:

"Again, the issuance of the patents to (Defendants' assignors) creates a prima facie presumption of a patentable difference from that of the Plaintiff's patent."

In concluding its opinion, the Court of Appeals properly examined and considered the decisions in the Second Circuit, in which the same patent 360,070 was in controversy as the foundation of the suit, in which the opinion by Judge Lacombe (65 Fed. Rep. 99) was affirmed by the Court of Appeals, in a per curiam opinion (69 Fed. Rep. 715).

Judge Lacombe's opinion in that case (p. 101 of the report) quotes the first claim of patent 360,070, and in discussing its terms by comparing that defendant's device therewith, element by element, used the word "auxiliary" in connection with the added valve device, and the word "independent" in defining its location and operation relatively to the "main" valve. After doing so he quotes the second claim, and says "the discussion of the first claim applies equally to this one. In the first claim actuation by the piston of the triple-valve was made an element. In this claim (the second) the inventor more closely limits the mode of such actuation. It is to be by a further traverse of that piston," etc.

He thus takes a view of that claim entirely antagonistic to that of Judge Morris, because it is evident that he considers claim 2 *more limited in its scope* than claim 1; and equally so that he perceives the necessity of including in claim 2, with the triple-valve, "an auxiliary-valve," and impliedly a port and passage governed thereby leading *directly* to the brake-cylinder; and that he found this combination in the New York defendant's device, because, he says—

"It has the main air-pipe, an auxiliary-reservoir, a brake-cylinder, a triple-valve, and an *auxiliary-valve* device, *independent of the main-valve*, for admitting air in the application of the brake *directly* from the main air-pipe to the brake-cylinder. The means for actuating the auxiliary-valve device is stated in the claim to be the piston of the triple-valve and the way in which it acts, as shown in the patent, is by direct impingement upon the stem of the auxiliary-valve device."

(The italics are not in the opinion).

There can be no doubt that Judge Lacombe was right, both in his view of claim 2 and of the infringement of that claim by the defendants in the New York case; and if so, there is equal certainty that Judge Morris was wrong on both these questions in the case at bar, and was properly reversed.

Can any one entertain for an instant a reasonable doubt that Judge Lacombe thought the second claim was not inclusive of an "auxiliary" valve, "independent" of the main valve? It cannot be so pretended with any reasonable hope of belief that he entertained any such view of claim 2 as did Judge Morris, or that he entertained any view thereof substantially different from that adopted by the Circuit Court of Appeals for the Fourth Circuit in the case at bar.

Corroborative evidence of this is furnished by the diagram of the device of the defendant in the case decided by Judge Lacombe, which diagram is annexed to and forms a part of the opinion of the Court of Appeals in the case at bar. (Page 883.)

In his injunction opinion, Judge Lacombe, in reference to the previous decisions in the New York suits, states:

"In these opinions it is held that the two patents, 360,070 and 376,837 disclosed, the one the emergency-valve (auxiliary-valve), the other the supplemental piston or special motor, which, *so far as the art has now*

"progressed appear to be *both* essential to the structure
"of the successful quick-action air-brake."

In expressing this opinion Judge Lacombe correctly deems the "auxiliary-valve" 41, of patent 360,070, and the supplemental piston of patent 376,837, as being "*both essential* to the structure of a successful quick-action air brake" as used in the Westinghouse system. He also says, incorrectly however, that these devices illustrate "the art as far as it has now progressed." Evidently the learned Judge had no knowledge of the later patents issued to Boyden where a new departure is made in the art, and wherein (see Boyden Patent No. 481,131, page 805, fourth paragraph) is disclosed the fact that a triple-valve "*per se* without auxiliary or supplemental-valve devices" and "*a single-valve*—the main valve of the triple proper—is made to perform the office of opening communication to the brake-cylinder from both the train-pipe and the auxiliary-reservoir in the quick application of the brakes for emergency stops."

Judge Lacombe had before him the question as to whether or not a brake mechanism employing alleged *different mechanical means* for opening an "*auxiliary valve*" which governed an *independent* port and passage to the brake-cylinder is an infringement of both the aforesaid Westinghouse patents?

This court has before it a very different question, to wit: whether or not in a triple-valve device an old *main* valve (22) of the triple, which continues as formerly, to perform the old *main* valve function of admitting auxiliary-reservoir air to the brake-cylinder to set the brakes, is now any the less the *main* valve of the "triple," and any the less the same valve that it always was, because it now also performs an added function, namely, admitting train-pipe air direct to the brake-cylinder through the *triple-valve chamber*, and without the use or employment of an independent or separate additional passage-way to the brake-cylinder? In answering this question it must be borne in mind that Mr. Boyden gave the old triple-valve the new capacity to do a *double* duty, or to perform the added function without an auxiliary-valve, and without any additional port or passage-way, by adding his own most ingenious discovery of the effect of *momentary differential pressures* in the triple-valve chambers, applied and accomplished by inserting the

partition or ring 9, with a passage B, to separate or divide the triple-valve chamber C from the piston-chamber D, and thus deliver train-pipe air, when desired, through the triple-valve chamber itself, direct to the brake-cylinder, the main valve of the triple being the governing means for admitting both reservoir air and train-pipe air to the brake-cylinder, instead of separate valves and passages, as in the plaintiffs, for effecting or governing those two distinct functions.

If, therefore, we accept Judge Lacombe's construction of claim 2 as the standard by which to determine whether or not the *Boyden* brake is or is not identical in principle of construction and operation with the Westinghouse device of the patent in suit, no one can entertain any reasonable doubt that the decision of the issue of infringement must necessarily be in favor of defendants in case at bar.

There was no denial on the part of the defendants in the last New York suit, that they used an "auxiliary-valve" and an independent passageway *to admit train-pipe air direct to the brake-cylinder*, their contention being that complainants' patents are only for specific means for actuating the emergency or "auxiliary valve" to control such passageway, and that they (the New York defendants) did not use the said *specific means*, and therefore did not infringe.

As to this the New York Court said, in effect: "The slightly different means which those defendants employed to actuate their '*auxiliary-valve device*' is within the doctrine of equivalents." And the Court was undoubtedly right in that.

But in the case at bar the issue is wholly different. The defendants herein show that in *their* structure, train-pipe air is admitted to the brake-cylinder by the "triple-valve" *per se, without the aid of a separate and independent port and passage, and without an "auxiliary-valve" or any valve other than the old main-valve of the triple; and that this result is accomplished by defendants by wholly novel means, confessedly new with Boyden*, and so (three times) adjudged to be (1) by the Patent Office, (2) by the Circuit Court and (3) by the Court of Appeals.

In the New York case, Judge Lacombe discusses the file and contents of patent 360,070, and says:

"There is nothing in the file wrapper or contents (360,070) to show that the Patent Office required, or that the inventor agreed to abandon, *what was the great feature of his invention, the emergency valve*, (the 'auxiliary valve' 41) or to give up whatever range of equivalents his patent might, as modified, fairly cover."

Of course not, and *we* don't contend that there is anything in the file wrapper and contents to show that the Patent Office required the inventor to give up what was "the great feature of his invention—the emergency valve," namely, the *auxiliary valve* 41, and the port and passage 46 governed thereby, to admit train-pipe pressure *direct* to the brake-cylinder. The file wrapper, however, *does* show clearly that the Patent Office *did* require him to give up the original and erased first claim for a triple-valve, "*provided with a device*" (generically) for admitting air directly from the main air-pipe to the brake-cylinder, and in cancelling said claim he cancelled the statement calling for an imaginary *integral* structure for that purpose. Therefore patent 360,070 *does not cover that*, and to confirm this act his letter accompanying the cancellation defines the novelty of his invention as residing in the *combination* with a *known triple-valve* of an "additional" and *auxiliary valve* adapted to be *actuated* by the piston of the triple to govern an *independent* port and passage leading *directly* to the brake-cylinder.

Mr. Westinghouse undoubtedly made a new invention, which, in the improved form shown in his later patent, is valuable and deserving of great commendation, and his patent therefor should be given a liberal construction, limited only by the necessary as well as by the self-imposed limitations clearly expressed in the patent itself. Judge Lacombe in defining it and construing the claims has imposed no greater limitations than we contend for, viz., that the new and "additional members" in the combination, no matter what their specific character, shall be physically and functionally "auxiliary" to the triple-valve proper (the old element which in the new Westinghouse combination is used without change and precisely as it was before) and that as respects the auxiliary or emergency valve it shall be "independent of the main-valve," and that the passageway governed thereby shall lead "*directly* from the main-air pipe to the brake-cylinder" (to quote the words of claim 2.)

Whether the patent in question be a pioneer or a mere improvement patent, cannot in either case warrant the application of any rule of construction which disregards these fundamental principles governing the interpretation of patent claims. Neither of the late cases of *Miller vs. Eagle Co.*, 151 U. S., nor *Morley vs. Lancaster*, 129 U. S., afford the slightest ground for so broadly interpreting the claims of a patent, whether pioneer or not, to include functional equivalents of mechanisms which, while producing the same result as those of the patent do so by means which are *not* substantially the same as those of the patent, but are so different in principle of construction and operation therefrom as to make their structural features and operative functions wholly repugnant to and irreconcilable with the description of the construction and operation of the patented mechanism as the same is set forth in the specification of the patent in question. In proof of which this Court said, in respect of the Morley machine, that the claims in question of his patent are not for a result or effect, irrespective of the *means* by which the effect is accomplished. "It is open to a subsequent inventor to accomplish the same result, if he can, by substantially different means." (See page 286 of the opinion.)

The Court of Appeals, in the case at bar, also referred to the file-wrapper and contents of the application for the patent 360,070, not as stated in the Plaintiffs' petition for *certiorari*, but properly as corroboratory of its conclusions already found and stated, from the patent itself, that the "additional" parts constituting the novel elements in the combination patented were (a) an "auxiliary"-valve, "independent" of the main valve, and (b) a "separate" passage way governed thereby, leading "directly" from the train-pipe to the brake-cylinder. And in this connection it is to be noted that the word "directly" appears in the 2d claim.

The application for patent 360,070, as filed by Mr. Westinghouse, contained the following as the original first claim (p. 714):

"1. In a brake mechanism the combination of a main air-pipe, an auxiliary reservoir, a brake-cylinder and a triple valve *provided with a device* for admitting air directly from the main air-pipe to the brake-cylinder; substantially as described." (The italics are ours.)

On objections by the Patent Office, including *inter alia* the citation of a prior patent, Mr. Westinghouse erased this claim.

As a logical conclusion of fact it cannot be open to doubt that the construction he is now asking for claim 2, *as against this defendant*, is exactly the generic but imaginary construction of mechanism which he sought to cover by said erased claim; and as a logical deduction of law from a long line of authorities in this Court, it is equally certain that he is estopped from so doing. Knapp vs. Morse, 150 U. S., 221; Corbin Lock Co. vs. Eagle Lock Co., 150 U. S., 38, and cases cited therein.

The decision in Reece vs. Sewing Machine Co., 61 Fed. Rep., 958, affords no countenance for any qualification of this salutary rule; besides, the facts in that case have no parallel with those in the case at bar. The decision in Reece's case turned on the fact that the narrowing amendment ought not to have been required and was inadvertantly made; but the decision distinctly recognizes the soundness of the previous authorities, which hold the patentee to the usual legal effect of such amendments in matters of substance, if it shall appear that the same were understandingly or voluntarily made, or were in fact necessary in view of the prior references cited, or of the state of the art generally. Indeed, the court refers to and quotes with approval its previous ruling in Ball and Socket Fastener Co. vs. Ball Glove Fastener Co., 58 Fed. Rep., 818, in the following words:

"The rule touching the effect of such amendments has been several times laid down by the Supreme Court in patent cases, although it is only a peculiar application of the general principles of law relative to the interpretation of instruments. In the case at bar, the amendments relate to the very pith and marrow of the alleged improvement, touch directly the question of novelty, and were understandingly and deliberately assented to; so that the rule of interpretation referred to undoubtedly applied."

The contents of the file of the application, in the rejection and erasure of the original first claim, and the explanatory letter of the applicant to the Patent Office, clearly show that the invention patented does *not* consist of some improvement in and of the triple-valve itself, nor in a triple-valve provided with "a device" for admitting air directly from the train-pipe to the brake-cylinder (the erased claim), but consists of a combi-

nation of the old triple-valve with some *added* and *auxiliary* means, physically and functionally independent therefrom, but so arranged relatively thereto as to be brought into action on the same old extreme traverse of the triple-valve piston, and operating to produce its own specific result in the performance of the aggregate results by the combined mechanisms. This is what the applicant, Westinghouse, in his letter to the Patent Office after the rejection of his original first claim meant, when he said he believed "such combination" to be novel. No one disputed that so far as this record discloses. What *is* disputed is his *present* contention that his 2d claim shall be now construed as for means which are *not* "auxiliary" to and *not* "independent" of the triple-valve as previously employed, and for means which are integral with and a part of the triple-valve, comprising modifications in the triple-valve chamber and a utilization of the main-valve, by force of such changes, to perform a double function—*i. e.*, its old triple-valve function and a new one which, but for such changes, it would be incapable of performing. These latter sentences describe this defendant's machine; a device comprising mechanisms never dreamed of by Mr. Westinghouse before he saw Boyden's machine, and which are so radically different in principle of construction and operation from his own, that by no stretch of imagination, based on anything found in patent 360,070, could they have been contemplated by the Patent Office officials to be within any of the claims of Westinghouse's patent as allowed to him.

It is respectfully submitted that there is no error in the decree sought to be reviewed, and that it should be affirmed.

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Of Counsel for Boyden Brake Co.

403 & 426
116
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BRIEF OF CHURCH
Supreme Court of the United States

October Term, 1896. Nos. 403 and 426.

Filed Oct. 22, 1896.

BOYDEN POWER BRAKE COMPANY,

GEORGE A. BOYDEN, President.
CHARLES E. MANN, Secretary.
WILLIAM WHITRIDGE, Treasurer.

AND

BOYDEN BRAKE COMPANY,

VS.

GEORGE WESTINGHOUSE, JR.

AND

THE WESTINGHOUSE AIR-BRAKE CO.

Appellants.

APPEAL.

GEORGE WESTINGHOUSE, JR.

AND

THE WESTINGHOUSE AIR-BRAKE CO.

Appellees.

VS.

BOYDEN POWER BRAKE COMPANY,

GEORGE A. BOYDEN, President.
CHARLES E. MANN, Secretary.
WILLIAM WHITRIDGE, Treasurer.

AND

BOYDEN BRAKE COMPANY,

Appellees.

CROSS-APPEAL.

ADDITIONAL BRIEF OF ARGUMENT,
FOR BOYDEN BRAKE CO.

MELVILLE CHURCH,
Of Counsel for the Boyden Brake Co.

Supreme Court of the United States.

October Term, 1896. Nos. ⁴⁰³~~347~~ and ⁴²⁶~~378~~

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CROSS-APPEAL.

THE SECOND CLAIM OF THE WESTINGHOUSE PATENT NO. 360,070 IS INVALID AND VOID.

The claim reads as follows:

"2. In a brake mechanism the combination of a main
"air-pipe, an auxiliary-reservoir, a brake-cylinder, and a
"triple-valve having a piston whose preliminary traverse
"admits air from the auxiliary-reservoir to the brake-
"cylinder, and which by a further traverse admits air
"directly from the main air-pipe to the brake-cylinder;
"substantially as set forth."

This claim is invalid and void—

(a) Because all its expressed elements were old and were combined in the same way in prior patented structures.

(b) Because, if the claim is read as for a combination other than of its expressed elements, it is a claim for a result.

(c) Because, if so read, it is a claim not only for a result, but for a result that is not useful.

THE COMBINATION OF THE EXPRESSED ELEMENTS OF THE
CLAIM WAS OLD.

The expressed elements of the claim are :

- (1) A main air-pipe.
- (2) An auxiliary-reservoir.
- (3) A brake-cylinder, and
- (4) A triple-valve whose piston has a "preliminary traverse" and also a "further traverse." These elements so combined are all found in the prior Westinghouse patent No. 220,556.

This is easily verified. On looking at Fig. 1 of patent 220,556 (p. 762) there will be found a passage P, P¹ leading from train-pipe to the piston-chamber B¹; a piston G in the piston-chamber constituting the valve for controlling the flow of air through port *a* (shown in Fig. 4) to the passage R leading to auxiliary-reservoir; a main slide-valve H having a passage *s* for controlling communication between the passage C leading from brake-cylinder to the exhaust port E, which opens to the atmosphere; the graduating-valve *e*¹ having its seat in the passage in the main slide-valve H for controlling the flow of air from auxiliary-reservoir to brake-cylinder through port *s*¹ in the slide-valve H and passage C; and the slide-valve H, as a whole, operating, when the piston G makes its further or full traverse under a considerable reduction of pressure in the train-pipe, to entirely uncover passage C and permit auxiliary-air to pass through passage C to the brake-cylinder, to secure the maximum braking effect in an emergency application of the brakes, or when the train-pipe is burst or ruptured.

The "preliminary traverse" of the piston of the device of this patent 220,556 occurs when ordinary service stops are made, while the "further traverse" is made in an emergency application of the brakes by the opening wide of the engineer's valve on the locomotive or upon an automatic application of the

brakes by the bursting of the train-pipe or the parting of the train into two sections.

The importance of the "further" or *full* traverse of the piston is dwelt upon in the Westinghouse catalogue issued in 1886, (page 594), and is testified to by Mr. Newbury, Complainant's expert, (page 263, X. Q. 358; pages 263-4, X. Q. 360-3;) by Mr. H. H. Westinghouse, (pages 270-1, Q. 378, page 328, X. Q. 565;) by Complainant's witness Kidder, a practical locomotive engineer, (page 432, X. Q. 781;) by Complainant's witness, Nellis, another practical locomotive engineer, (page 438, X. Q. 807.)

Limited, then, to a combination of its expressed elements the second claim is anticipated by said prior Westinghouse patent No. 220,556.

IF THE CLAIM IS READ AS FOR A COMBINATION OTHER THAN ITS EXPRESSED ELEMENTS, IT IS A CLAIM FOR A RESULT.

If the claim be not thus limited to the combination of its expressed elements, but, because of its inclusion of the phrase, "and which by a further traverse admits air directly from the main air pipe to the brake-cylinder, substantially as set forth," it is attempted to be extended to cover anything more than the expressed elements plus the "additional" elements described as such in the body of the specification and embodied in the first and fourth claims, it is invalid and void as being a claim for a mere result.

Patents for machines are not granted for an idea, an abstraction or a result, but for concrete, tangible mechanical elements, or combinations of mechanical elements.

In *Burr vs. Duryear*, 1 Wall., 570, this Court, speaking through Mr. Justice Grier, said:

"The Patent Act grants a monopoly to any one who
"may have discovered or invented any new and useful
"art, machine, manufacture or composition of matter.

"That the invention of Wells comes within the category of a '*machine*' cannot be disputed. The law
"requires that the specification 'should set forth the principle and the several modes in which he has contemplated the application of that principle, or character by
"which it may be distinguished from other inventions,
"and shall particularly point out the part, improvement,

“or combination which he claims as his own invention or ‘discovery.’ We find here no authority to grant a patent for a ‘principle’ or a mode of operation, or an *idea*, or ‘any other abstraction. A machine is a concrete thing, ‘consisting of parts, or of certain devices and combination of devices. The principle of a machine is properly ‘defined to be its mode of operation, or that peculiar combination of devices which distinguish it from other machines. A machine is not a principle or an idea. ‘The use of ill defined abstract phraseology is the frequent source of error. It requires no great ingenuity to mystify a subject by the use of abstract terms of ‘indefinite or equivocal meaning. Because the law ‘requires a patentee to explain the mode of operation of ‘his peculiar machine which distinguishes it from others, ‘it does not authorize a patent for a ‘mode of operation ‘as exhibited in the machine,’ much less can any inference be drawn from the statute, that an inventor who ‘has made an improvement in a machine, and thus effects ‘the desired result in a better or cheaper manner than ‘before, can include all previous inventions and have a ‘claim to the whole art, discovery, or machine which he ‘has improved. All others have an equal right to make ‘improved machines, provided they do not embody the ‘same, or substantially the same devices, or combination ‘of devices, which constitute the peculiar characteristics ‘of the previous invention.”

In *Fuller vs. Yentzer*, 94 U.S. 288, this Court speaking through Mr. Justice Clifford, also said:

“Patents for a machine will not be sustained if the ‘claim is for a result, the established rule being that the ‘invention, if any, within the meaning of the Patent ‘Act, consists in the means or apparatus by which the ‘result is obtained, and not merely in the mode of operation independent of the mechanical devices employed ; ‘nor will a patent be held valid for a principle or for an ‘idea, or any other mere abstraction.”

Now, I submit, no candid mind can read the second claim of the patent in suit without concluding that it embodies an

attempt to claim a result. To say that the "further traverse" of the piston of the triple-valve "admits air directly from the main air pipe to the brake cylinder" is simply to state the result accomplished when such movement of the piston takes place. It does not tell us *how* that result is accomplished, *by what means* it is accomplished; but simply that it is accomplished. The claim is in effect for the *doing* of the thing without reference to the way of or *means* for doing it.

The case cannot be distinguished in principle from the leading case of O'Reilly vs. Morse, 15 How., 62. In that great case the eighth claim of the Morse patent, which was held invalid, read as follows:

"8th. I do not propose to limit myself to the specific machinery or parts of machinery described in the foregoing specification and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electro magnetism, however developed for marking or printing intelligible characters, signs, or letters, at any distance, being a new application of that power of which I claim to be the first inventor or discoverer."

Chief Justice Taney, in delivering the opinion of this Court, said, (page 112:)

"It is impossible to misunderstand the extent of this claim. He claims the exclusive right to every improvement where the motive power is the electric or galvanic current, and the result is the marking or printing in intelligible characters, signs, or letters, at a distance. If this claim can be maintained, it matters not by what processes or machinery the result is accomplished. For aught that we now know some future inventor, in the onward march of science, may discover a mode of writing or of printing at a distance by means of the electric or galvanic current, without using any part of the process or combination set forth in the Plaintiff's specification.

"His invention may be less complicated—less liable to get out of order—less expensive in construction, and in its operation, but if it is covered by this patent the

“inventor could not use it, nor the public have the benefit of it without the permission of this patentee.”

Again, page 119:

“The provisions of the Acts of Congress in relation to patents may be summed up in a few words. Whoever discovers that a certain useful result will be produced, in any art, machine, manufacture or composition of matter, by the use of certain means, is entitled to a patent for it; provided he specifies the means he uses in a manner so full and exact that any one skilled in the science to which it appertains can, by using the means he specifies, without any addition to or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes, the patent is void. And if it can be done, then the patent confers on him the exclusive right to use the means he specifies to produce the result or effect he describes, and nothing more. And it makes no difference, in this respect, whether the effect is produced by a chemical agency or combination; or by the application of discoveries or principles in natural philosophy known or unknown before his invention; or by machinery acting altogether upon mechanical principles. In either case he must describe the manner and process as above mentioned, and the end it accomplishes. And any one may lawfully accomplish the same end without infringing the patent, if he uses means substantially different from those described.

“Indeed, if the eighth claim of the patentee can be maintained, there was no necessity for any specification further than to say that he had discovered that, by using the motive power of electro magnetism, he could print intelligible characters at any distance. We presume it will be admitted on all hands that no patent could have issued on such a specification. Yet this claim can derive no aid from the specification filed. It is outside of it, and, the patentee claims, beyond it. And if it stands, it must stand simply on the ground that the broad terms above mentioned were a sufficient descrip-

"tion, and entitled him to a patent in terms equally
 "broad. In our judgment, the Act of Congress cannot be
 "so construed."

To show how applicable the principle of the Morse case is to the one at bar, the *eighth* claim of Morse and the *second* claim of the patent in suit *paraphrased* are here set up in parallel columns for comparison :

MORSE'S VOID EIGHTH
 CLAIM.

"8th. I do not propose to
 "limit myself to the specific
 "machinery or parts of ma-
 "chinery described in the fore-
 "going specification and claims,
 "the essence of my invention
 "being the use of the motive
 "power of the electric or gal-
 "vanic current, which I call
 "electro magnetism, however
 "developed for marking or
 "printing intelligible charac-
 "ters, signs, or letters, at any
 "distance, being a new appli-
 "cation of that power of which
 "I claim to be the first in-
 "ventor or discoverer."

WESTINGHOUSE'S SECOND CLAIM
 PARAPHRASED.

2d. I do not propose to
 limit myself to the specific
 machinery or parts of ma-
 chinery described in the fore-
 going specification and claims,
 the essence of my invention
 being the use of that part of
 the motion of the triple-valve
 piston, which I call the "fur-
 ther traverse," however devel-
 oped for admitting air
 directly from the main air-
 pipe to the brake-cylinder,
 being a new application of
 that piston-motion of which
 I claim to be the first in-
 ventor or discoverer.

This is not an unfair comparison. Morse endeavored to cover the use of the motive power of the electric or galvanic current for printing intelligible characters, signs or letters at any distance without any limitation as to the means to be employed, while Westinghouse, in like manner, attempted to cover the use of the motion of the triple-valve piston to admit air directly from the main air-pipe to the brake-cylinder, irrespective of the kind or character of the means employed for achieving that result. It was the omission of the printing or recording devices by which the result of printing intelligible characters at a distance was accomplished that rendered the eighth claim of

Morse invalid, just as it is the omission of the additional auxiliary-valve device by which the result of admitting train-pipe air directly to the brake-cylinder is effected that renders the second claim of Westinghouse invalid.

Both Morse and Westinghouse tried to appropriate an idea to cover all ways and means of effecting a result, and the condemnatory language of this Court applies to each of them with equal force.

THE RESULT CLAIMED AS A USELESS RESULT.

Not only is this second claim a claim for a mere result, but it is also a claim for a result that is not useful, and, hence, in any view not patentable.

The second claim, like the first claim, refers to the specification by the phrase "substantially as set forth," but nowhere in the specification is it suggested that any brake apparatus had been conceived of by the patentee wherein the result of quick action could be accomplished by the mere admission of train-pipe air alone, "directly from the main air-pipe to the brake-cylinder."

The only apparatus described or hinted at in the patent for accomplishing quick-action is an apparatus in which, upon the full or further traverse of the piston, train-pipe air *and* auxiliary-reservoir air are *both* admitted, substantially simultaneously, into the brake-cylinder.

The claim, therefore, not only states a result, instead of competent mechanism for accomplishing a result, but it states a result that the patentee had not indicated might be accomplished, and a result that, according to what is stated in the specification and in the evidence of all the experts in the case, is entirely lacking in utility.

If it is conceded, as it must be, that the additional function or result of admitting auxiliary-reservoir pressure as well as train-pipe pressure to the brake-cylinder during the further traverse of the piston *is necessary*, but is contended that the Court may read into this second claim such additional function or result, the complete answer is, that, to do so, would make the second claim identical with the third claim, that is not in

issue and that is not alleged to be infringed, which reads as follows :

"3. In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder and a triple-valve having a piston whose preliminary traverse admits air from the auxiliary-reservoir to the brake-cylinder, and which by a further traverse admits air directly from the main air-pipe to the brake-cylinder and effects a *second admission of air from the auxiliary reservoir to the brake-cylinder*; substantially as set forth."

This third claim, like the second claim, is clearly void because embodying an attempt to claim a result, but it at least has the merit of stating a full and useful result, which the second claim has not.

THE PATENTEE, NOT THE PUBLIC, IS RESPONSIBLE FOR THE WORDING OF THE CLAIM AND HE AND NOT THE PUBLIC MUST SUFFER IF IT IS DEFECTIVE.

Claims are required by the Statute. They are necessary in order that the metes and bounds of a patent may be defined with clearness, that the public may know what is protected and what is free.

This case develops no equities requiring a departure from the ordinary rules governing the treatment of patents and patentees.

Westinghouse was an old inventor, a veteran patentee, of ample means and favored with the aid of experienced counsel and solicitors. Everything done in obtaining his patent was with eyes wide open and under the fullest advice. In pressing the second claim he simply overreached as did Morse with his eighth claim.

If the second claim were the only claim of the patent the Court might possibly, in their anxiety to prevent an entire loss of the invention, construe the claim, by narrowing it, so as to include, under the terms "*substantially as set forth*," the additional auxiliary-valve device described and shown in the specification and drawings. This would have been going to the

very verge of liberality. But no such exigency, no such necessity exists. There are, as we have seen, other claims in the patent which fully cover the structure which the patentee has actually shown and described, and it would be a vain thing, as well as repugnant to all settled rules of construction, to interpret the second claim, for the mere purpose of saving it, *to mean the same thing as some other claim.*

Who should suffer from this faulty claim—the patentee, who drew it, or the Defendants, who had no hand in its preparation?

Complainant admits that it is defective, but asks the Court to construe into it *just enough* to hold the Defendant's device, which does not embody the elements of the other claims, but *not enough* to make it open to the objection of being the same as the other claims.

This Court will not adopt any such elastic construction of plain language. They will rather reiterate what they said in *White vs. Dunbar*, 119 U. S. 47, where, speaking through Mr. Justice Bradley, they said:

“Some persons seem to suppose that a claim in a patent is like a nose of wax, which may be turned and twisted in any direction, by merely referring to the specification, so as to make it include something more than or something different from, what its words express. The context may, undoubtedly, be resorted to, and often is resorted to for the purpose of better understanding the meaning of the claim; but not for the purpose of changing it, and making it different from what it is.”

“The claim is a statutory requirement, prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms.”

MELVILLE CHURCH,
Of Counsel for Defendants.



For Nos. 403 and 426.

Brief of Fenton, Hill & Church for
Supreme Court of the United States.

October Term, 1896. Nos. 403 and 426.

Filed Feb. 25, 1897.

BOYDEN POWER BRAKE COMPANY,

GEORGE A. BOYDEN, President.

CHARLES B. MANN, Secretary.

WILLIAM WHITRIDGE, Treasurer.

AND

BOYDEN BRAKE COMPANY,

VS.

GEORGE WESTINGHOUSE, JR.

AND

THE WESTINGHOUSE AIR-BRAKE CO.

Appellees.

GEORGE WESTINGHOUSE, JR.

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Appellees.

Office Supreme Court, U. S.

FILED.

FEB 25 1897

JAMES H. MCKENNEY,

CLERK.

CROSS-APPEAL.

BRIEF OF
RE-ARGUMENT
FOR BOYDEN BRAKE CO.

MELVILLE CHURCH,

HECTOR T. FENTON,
LYSANDER HILL,
Solicitors for the Boyden Brake Co.

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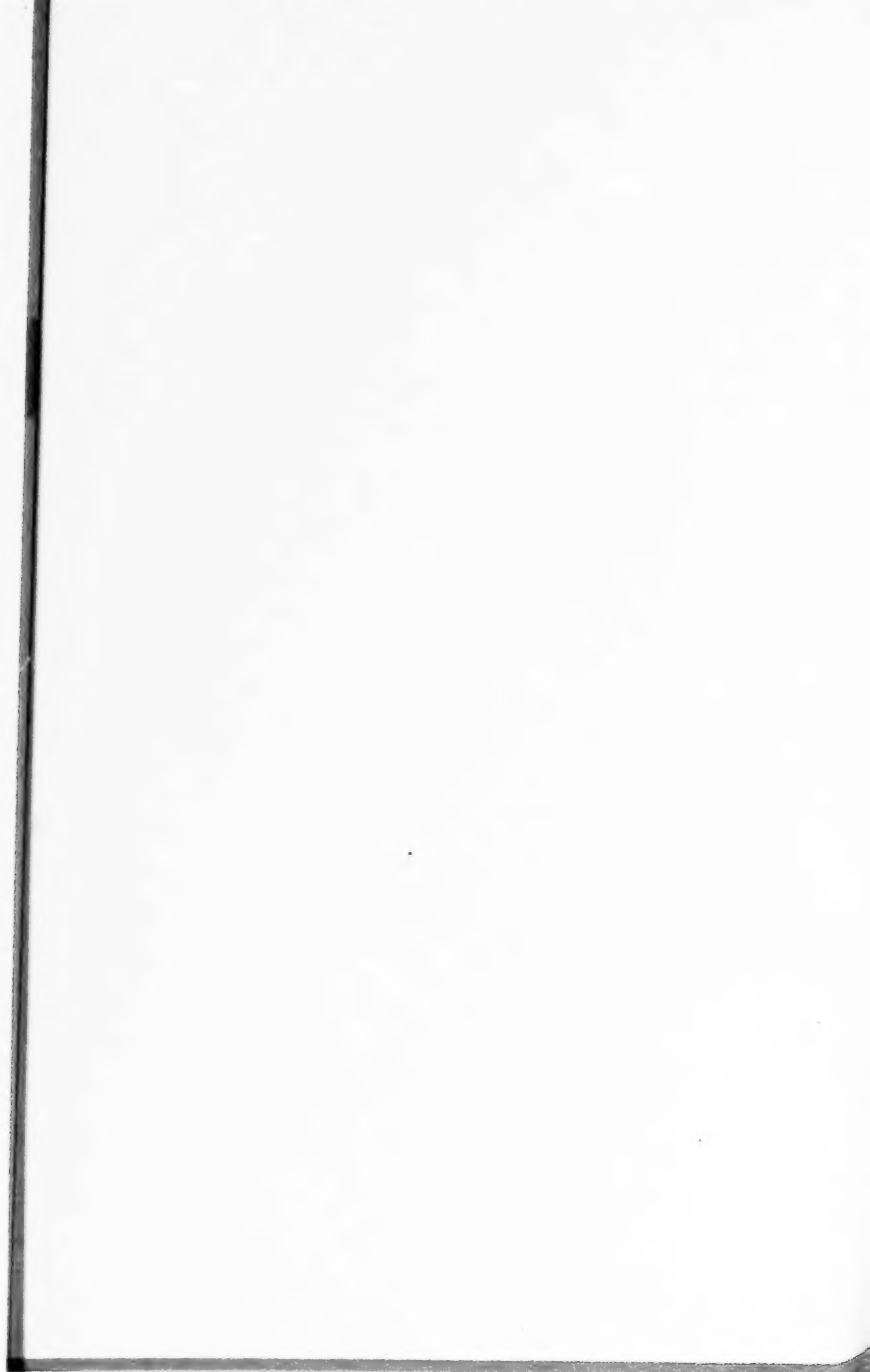
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Supreme Court of the United States.

October Term, 1896. Nos. 403 and 426.

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CROSS-APPEAL.

NOTES OF RE-ARGUMENT,

BY

MR. FENTON,

ON BEHALF OF THE BOYDEN BRAKE COMPANY.

The record in this case discloses that the appellate decree complained of adjudicated a single issue of fact. The patent in suit was not attacked for want of novelty, nor is it alleged to be invalid in any respect under proper construction of its claims, nor is there any valid ground for dispute in that regard except as to the *second* claim. There is no REAL controversy involved in this case except the single question of whether the two machines of the parties appellant and appellee (which are admittedly widely different in *mechanical* construction), are or are not identical in *principle* of construction and operation,

or whether (as we contend and as both courts below have adjudged) they are constructed and operate on radically different principles. Of course the interpretation of the disputed claim 2 is necessarily incidently involved under such an issue of fact, but that is true of such an issue in every patent cause.

An Analysis of the Plaintiffs' Assignments of Error.

The assignments of error set forth on pages 2 to 4 of the Westinghouse principal brief, are seven in number. Not a single one of them except the 6th and 7th (which are practically the same and relate to the findings of the Court under the issue of infringement), raise any question decisive of the single and only issue involved in the cause. Of the remaining assignments of error, the *first* sets up an alleged conflict of decision between the appellate tribunals in the Second and Fourth Circuits; the *second* alleges that the Court of Appeals adjudicated the second claim of the patent in suit to be invalid; the *third* alleges error in giving improper effect to the defendants' patent as a piece of evidence; the *fourth* alleges error in law in the effect given to the term "substantially as set forth" in construing the claims; and the *fifth* avers error in the effect given to the file and contents of the application for the patent in suit.

It is proposed to direct this argument principally to a brief review of the errors assigned and to show their immateriality, leaving to my colleague to present a more extended argument differentiating in detail the machines of the parties, showing also the evolution of each of them and demonstrating their radical differences in principle.

1. As to the alleged conflict of decision between the appellate tribunals in the Second and Fourth Circuits in respect of the validity of claim 2. Of course this allegation presupposes that they both passed upon the same question arising upon the same or analogous premises. They did nothing of the kind.

Neither of them passed upon an abstract question. Neither of them construed claim 2 regardless of the character of the alleged infringing device which it was charged infringed it. The two tribunals had before them, respectively, two totally different structures alleged to infringe. The defendants' device (N. Y. Air Brake Co.) before the Court in the Second Circuit, was an obvious infringement; and it was equally obvious that the defendants' (Boyden) device before the appellate tribunal in the Fourth Circuit was not. So much was this the case, that the defendants in the Fourth Circuit asked the Court to apply the interpretation of the 2d claim as adjudicated in the Second Circuit. There is not necessarily any conflict of decision as respects the validity and scope of a patent claim, merely because as between two alleged infringing devices, one is held to infringe the claim and the other is not.

This alleged conflict of decision can be disposed of very briefly. It has been fully discussed in my printed brief heretofore filed (see pages 21 to 26), to which special reference is requested. It is not proposed now to take up time by discussing the propriety or correctness of dicta appearing in the opinion of either Court. Faults in that respect may doubtless be found in both. We are to consider only the correctness of the matter *adjudicated*; not mere isolated inartificial expressions occurring in the opinions of the respective Courts. Whether or not there may be paragraphs which, considered apart from the whole, are open to criticism, is not of the least importance *in the decision of this case in this court*, if we can gather from the whole opinion of the Appellate Court below that it *adjudicated the single issue* in the case *correctly*. This appeal is taken to review the *decree* of the Court below, not mere dicta in its *opinion*.

If, however, we look to the opinion to ascertain on what conclusions the decree is founded, a single reference will be sufficient to demonstrate beyond any doubt that the decree was right. The Court of Appeals, whether it meant to hold claim 2

invalid under the doctrine of *Morse vs. O'Reilly*, certainly did not rest its adjudication thereon, but disposed of the case on a different ground, because, after discussing claim 2, it gave effect to it as a valid claim by stating in substance that its concluding words, "substantially as set forth," implied the presence of the elements necessary to perform the function recited in the claim, but did not confine the claim to the particular construction of these elements. These two propositions appear very clearly from the opinion (see R., p. 878, folios 1416 and 1417), in which the Court said:

Folio 1416—

"These words ('substantially as described') limit the "general terms of the specification which set out the "*function* * * * to his own means or their *mechanical equivalent* for performing the function."

Folio 1417—

"The question at bar is whether Boyden's (quick-action improvement on the triple-valve of the old patent, 220,556) "is the mechanical equivalent of Westinghouse's (quick-action improvement on the triple-valve of his old patent, 220,556). * * * They seem to us to differ "as widely from each other as two devices for accomplishing the same result can well differ." (R., p. 880, l. 30.)

Thus showing that the Court of Appeals, notwithstanding what it said in just criticism of the form of the claim, actually rested its decision upon two propositions: 1st. That the "*question at bar*" was whether or not the machines of Boyden and Westinghouse were the "mechanical equivalents" of each other; and, 2d, Finding, on comparison, that they were radically different from each other.

If these two quotations do not show conclusively that the Appellate Court rested its decision solely on the radical differences in principle between the two machines, there is no force in English words.

There was no effort made or argument advanced by the Boyden Brake Company in the Court of Appeals to dispute, qualify

or limit the scope or effect of the decisions in the Second Circuit as *res judicata* on the construction of the claims; but, on the contrary, we relied upon and urged upon the Appellate Court in the Fourth Circuit that the construction and interpretation of the plaintiffs' patent, and especially of claim 2 thereof, by Judge Lacombe (65 Fed. Rep., 99, affirmed on appeal), was correct; and that, if accepted as correct and followed by the Court of Appeals in the Fourth Circuit, it required that the latter tribunal should reverse the decree entered by the Circuit Court in the case at bar, which construed the claim 2 aforesaid very differently and inconsistently with the construction given to it in the Second Circuit; and this I shall endeavor to clearly demonstrate in its appropriate place in this argument.

The radical differences between the devices of the respective defendants in the two circuits is clearly pointed out in the opinion of Judge Hughes.

On the subject of the effect of the decision of Judge Lacombe, alleged by the Westinghouse counsel to be *res judicata* on the same question before the appellate tribunal in the 4th circuit, the learned Judge in the latter court stated the difference between the two questions before the two respective courts in the following words (R., p. 883):

"Here it is contended (by plaintiffs) that the mere use of the extreme traverse of the triple-valve piston to effect the same *functional* result which was effected by Westinghouse in 360,070, constitutes an infringement, irrespectively of the additional means employed. There it was ruled that the use of the extreme traverse and of an additional machine attached to the original 220,556, which was structurally and *mechanically* equivalent to 360,070, was an infringement of the latter patent. The cases are different, and not on all fours."

The learned Judge (Hughes) was entirely correct in that statement. The defendant's machine before the New York court (as shown opp. R., p. 883), contained an "auxiliary" valve and a

segregated passageway controlled by it; and Judge Lacombe found infringement (see 65 Fed., p. 101), because of the presence in that defendant's machine of a "triple-valve" and an auxiliary-valve device, independent of the "main valve"; adding in substance (page 102 of report) that claim 1, which includes these elements, does not differ from claim 2 (here under discussion), except that the latter is even more limited—*i. e.*, that "it is to be by a further traverse of the piston." And this is the sole distinction which differentiates the two claims. Obviously there is no conflict of decision between the two courts on the same *question of the construction of claim 2*. The pretence that Judge Hughes' remarks on the invalidity of functional or result claims, constitutes such a conflict, is without foundation, when it is seen that the "question at bar," as stated by the court in the 4th circuit, and on the adjudication of which the decree of reversal was rested, was whether or not, under the same interpretation of the claim 2 as stated by Judge Lacombe, the machines of the parties in the case at bar were or were not *mechanical* equivalents; and he held, and properly held, that they were not. (See insert illustrating the three structures.)

2. As to the alleged errors set forth in the third assignment of error, what matters it, whether the learned Judge who wrote the opinion of the Appellate Court in the Fourth Circuit was right or wrong in saying that "the Patent Office employs the best experts in mechanics which it can secure in this and other countries." Is the time of this Court to be wasted in deciding that moot question? If it has any materiality at all it is presumably true, no matter what the actual fact may be, as the statute requires the Commissioner to appoint an examining corps skilled in the arts and does *not* require him to confine his appointments to citizens of the United States. The second branch of this assignment is without merit, for the language criticised is a paraphrase of a sentence correctly

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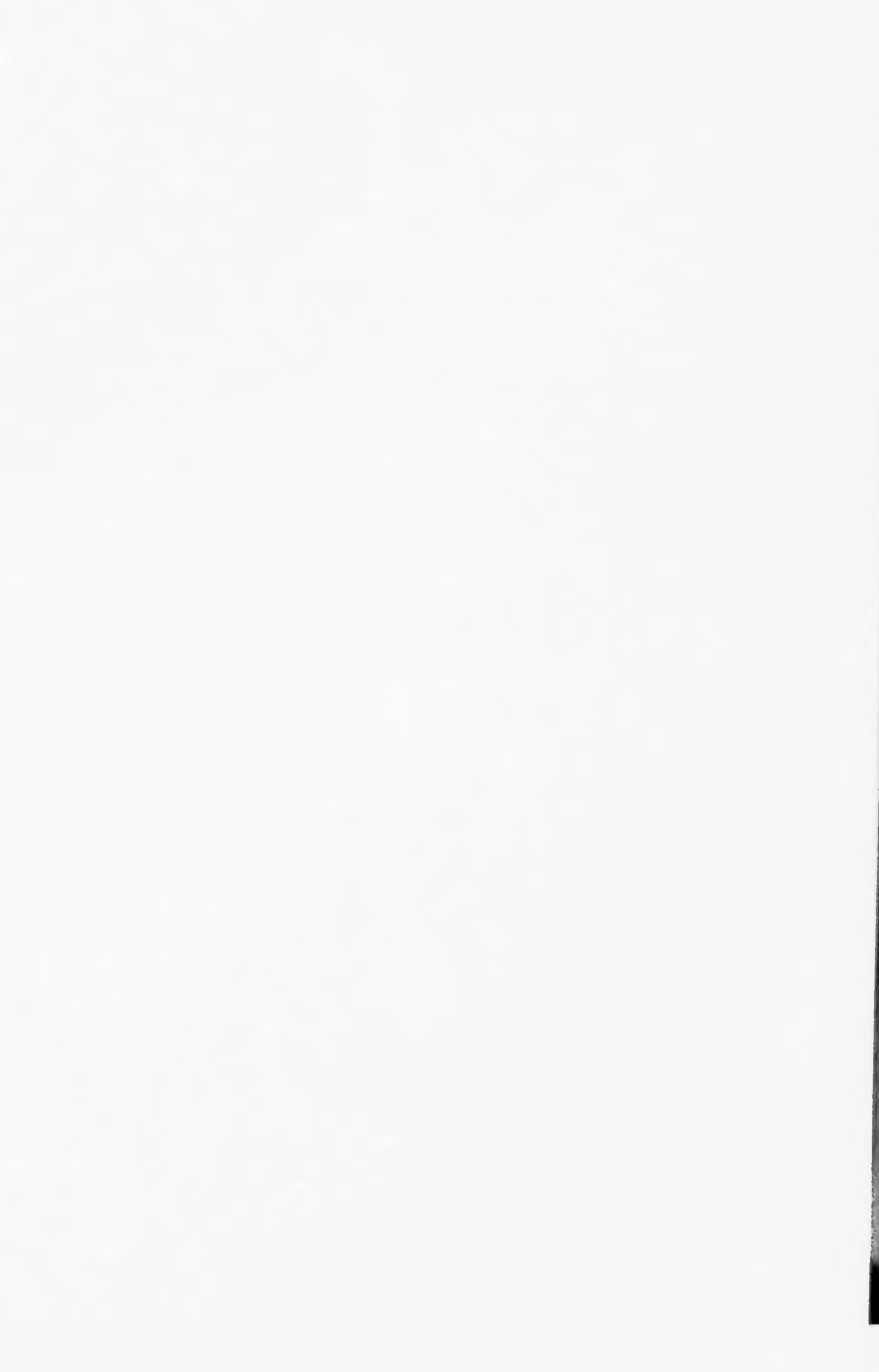
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used by so eminent a patent jurist as the late Justice Bradley, in *Burns vs. Meyres* 100 U. S., 671 (672). The third and fourth branches of this assignment of error are not well founded because it is too well settled in this Court to be open to dispute at this late day, that the action of the Patent office in awarding a patent to the defendant is evidence of some considerable weight that the thing described and claimed therein is not identical with the subject matter of a prior patent, especially where such prior patent was called to the attention of the Commissioner and actually considered by him in passing upon the novelty and patentability of the later device. *Miller vs. Eagle Co.* 151, U. S. 186 (208). The reason of this rule of evidence is clearly stated in *Corning vs. Burden*, 15 Howard 252.

3. As to the fourth assignment of error, it is respectfully submitted that the Court below was not only substantially correct, but absolutely accurate in its definition of the term "substantially as described."

The Court said (see R., p. 878, folio 1416); "These words limit the general terms of the specification which set out the *function* performed by the invention and confine the inventor's rights to his own *means*, or their *mechanical equivalent* of performing the function." No possible objection can be successfully made to this strictly accurate and broad definition.

4. The matter of the fifth assignment of error relating to the effect of the file wrapper and contents of the application for the patent in suit, in the interpretation of the claim, will be discussed more fully hereafter in the brief argument which I shall make on the construction of the claims.

In approaching the consideration of this single issue of non-infringement, we may first refer to three potential propositions, none of which can be successfully disputed:—

1. The two machines of the parties litigant are obviously and admittedly as widely different in mechanical construction as two things to produce the same result can possibly be.

2. The fact that two devices produce and are intended to produce the same result, does not establish that they are alike in principle, nor is it even *prima facie* evidence thereof.

3. That the burden of sustaining the affirmative of the issue of infringement beyond any reasonable doubt is upon the plaintiff, and that this burden is not discharged merely by showing that two machines were designed to produce or do in fact produce the same result, if upon the plaintiffs' proofs comparing the two mechanical devices structurally, the question of identity or non-identity in principle of construction and operation is left open or qualified by the least conjecture or doubt.

The Defendants' Patents and Their Effect as Evidence Under the Issue of Infringement.

The radical differences in principle between the plaintiffs and defendants machines, are fully described in three patents to defendants, differentiating the device from the plaintiffs invention of the patent in suit, and containing grants to defendants of claims of such breadth and scope as to be utterly inconsistent with the theory that the defendants' machine is at all alike to the plaintiffs in principle.

The record contains evidence showing the evolution of the defendants' device which is alleged to infringe. The device, as admitted, is the structure described in the patents granted to Boyden August 16, 1892, Nos. 481,134, 481,135 and 481,136. Application was filed in the Patent Office for one of these September 30, 1889, before this suit was brought.

They all retain the essential underlying principle of the previous Boyden 1883 patent (R., p. 498) in that they provide means to convey *train-pipe air* to the brake-cylinder *through the triple-valve-chamber* (and not through any separate and independent passageway) the said machines retaining all the usual parts and functions of a triple-valve per se. The means (patented by Nos. 481,134, etc.), for performing the additional function

referred to are shown in a diagram opposite page 14 of my former brief, and so fully described, discussed and compared with the complainants' device that it is not necessary now to reiterate.

The proposition now to be discussed is the legal effect of this differentiation, which is found expressed on the face of these later Boyden patents, and the broad claims allowed for this distinctively different and novel device.

The reason for the usual exclusion of such evidence is founded on the theory that a posterior patent could not justify an infringement of a prior one *for the same invention*.

The posterior patents are not set up in this case as being for the *same invention* as the plaintiffs', but as evidence that the defendants' device, described and claimed in it, *differs essentially, quoad* the part or improvement claimed in the prior patent, from the machine of such prior patent.

These patents show by their descriptive matter and by their claims the *quasi* judicial finding of the Patent Office, that the device described and claimed in the later patents to defendants is not the mechanical equivalent for, or an improvement on, the device described in the earlier patent of complainants, and that the devices of the two patents are for *distinct and different* inventions, constructed and operating on different principles, though both producing the same result.

The question is presented in the case at bar under the third assignment of error and the argument on it in the Westinghouse brief (see page 3 pages 83 to 91). In the case at bar the Circuit Court practically refused to give any weight whatever to these patents as evidence for the purpose for which they were introduced, on the ground that the Patent Office was "unassisted by testimony as to the state of the art at the date of the Westinghouse patent, and without testimony as to the scope of the Westinghouse quick-action invention." (See Record, page 852.)

This is a new doctrine without precedent. It is no part of the duty of the Patent Office to take *testimony* as to the state

of the art or as to the scope and importance of an invention. When an application such as Boyden's was filed it was the duty of the Commissioner to consider the patent here in suit as part of the prior art, to determine whether or not they were for the same invention in whole or in part, or whether they were for different inventions constructed and operating on different principles.

Presumably the Commissioner did his duty, and the record in this case shows that he did so in fact. The Court of Appeals, however, correctly gave due and proper weight to the defendants' patents as evidence of non-identity. That Court did not decide that the Patent Office had passed upon the question of "infringement" in the narrow sense pretended in the Westinghouse brief, but distinctly held that the ruling of the Patent Office in granting the defendants' patents was prima facie evidence of non-identity, and distinctly said also that this ruling was not conclusive, but was entitled, however, to great respect and to have due weight given to it. This ruling was absolutely correct, as will appear by reference to *Miller vs. Eagle Co.*, 151 U. S., 208, which affirms Mr. Justice Grier in *Corning vs. Burden*, 15 How., 252. The latter case discusses this question so fully that we ask special attention to it. Mr. Justice Grier calls our attention to the fact that since the patent act requiring examinations of applications as to novelty, the grant of a patent to the plaintiffs is prima facie evidence of novelty. The learned Judge said that in cases of doubt the defendant is equally entitled to the same presumptions arising from the grant of a patent to him. Practically applying the rule in *Brooks vs. Bicknell*, 2 McLean, 432, Justice McLean said that under the issue of infringement, where the evidence is evenly balanced, the burden of proof being on the plaintiff, if the defendant has a patent for the device used by him which is not a mere improvement upon the plaintiff's, the defendant's patent is sufficient to turn the scale in his favor, under the issue of

infringement, or even to resolve a *doubt* in the same way (if there be a doubt) under this issue. (See also *New Mfg. Co. vs. Superior Co.*, 56 Fed., R., p. 152.)

An examination of the patents granted to Mr. Boyden for this ingenious invention, Nos. 481,134, 481,135 and 481,136, will show that he therein fully set forth the principle of his invention and clearly distinguished it from that of the patent in suit. We call attention especially to the following extract from the specification (R., p. 805, l. 3, of his patent, No. 481,134), which was filed in the Patent Office *before* this suit was brought (the italics being our own), viz:

"Efforts have been made heretofore to combine with a
 "triple-valve certain *additional* mechanism by which
 "train-pipe air could be introduced directly into the
 "brake-cylinder in effecting the application of the brakes
 "for emergency stops; but in every such instance a *sup-*
 "*plemental passage* or passages together with a *supple-*
 "*mental* or *auxiliary* valve, has had to be employed in
 "connection with the triple-valve proper, in order that
 "the ordinary functions of the triple-valve might be pre-
 "served and the additional function of introducing train-
 "pipe air into the brake-cylinder for emergency stops
 "be combined therewith." "An example of the class of
 "valves referred to in the last preceding paragraph which
 "employ an auxiliary-valve, combined with an ordinary
 "triple-valve, is shown in United States patent to George
 "Westinghouse, Jr, dated March 29, 1887, No. 369,070."

"It will be seen that my present invention for introduc-
 "ing train-pipe air into the brake-cylinder for emergency
 "stops differs essentially from the device shown in the
 "said Patent No. 369,070, because I have provided a *new*
 "*principle of construction* and a *new mode of operation*
 "by use of which the desired result aforesaid may be pro-
 "duced *without the aid of the auxiliary-valve heretofore*
 "*required for the purpose.*"

It will be seen that the above extracts fully distinguish the Boyden invention from that of the patent in suit, and, by

granting the patents to Boyden containing these statements, and broad claims based upon the novel device thus differentiated, the disinterested and experienced experts in the examining corps of the Patent Office signified their full recognition of the facts stated, which accord in all respects with the position taken in this suit by the defendants' experts.

A casual glance at claim 1 (R. p. 806) of defendants' patent 481,134 to Boyden, will disclose, in a condensed statement therein, how it differs in principle and operation from the patent in suit. The Patent Office was obliged to consider the question of novelty, in a patentable sense, of Boyden's device as compared with that of the patent in suit. Its decision in favor of Boyden, by the grant to him of these patents, raises a strong *legal* presumption of *non-identity* heretofore referred to in the authorities cited, and is quite sufficient to turn the scale in his favor on the issue of infringement when, on comparing them with the prior art, it is seen that they are *independent* improvements upon the prior "triple-valve", and not a mere improvement on the patent in suit.

In *Morgan vs. Daniels*, 153 U. S., 120, this Court said (p. 123):

"The grant of letters patent is *prima facie* evidence
 "that the patentee is the first inventor of the device
 "described in the letters patent and of its novelty (*Smith*
vs. Goodyear Co., 93 U. S., 486). Not only is the burden
 "of proof to make good the defense (of want of novelty)
 "upon the party setting it up, but it has been held that
 "every reasonable doubt should be resolved against him."

In *Morgan vs. Daniels* the suit was brought under Sec. 4915, Rev. Stat. by the unsuccessful party in an interference before the Patent Office, against the successful party, alleging that the decision of the Office was wrong and that the plaintiff was really the first inventor of the device in controversy. This Court held, as succinctly and correctly stated in the syllabus—

"When the question between the contending parties as
 "to priority of invention is decided in the Patent Office,

“such decision so made must be accepted as controlling
 “upon that question of fact in any subsequent suit
 “between the same parties, unless the contrary is estab-
 “lished by testimony which in character and amount
 “carries thorough conviction.”

The Court also said that the rule quoted as to the burden of proof under the defense of want of novelty is applicable to a controversy in the courts between a successful and an unsuccessful party to an interference case previously decided in the Patent Office, the language of the Court being as follows :

“These two cases are closely in point. The plaintiff in
 “this case, like the defendant in those cases, is challeng-
 “ing the priority awarded by the Patent Office, and
 “should, we think, be held to a strict proof,”

the Court adding that this rule is more stringent even than the rule applied by the Court below, as stated by it in the following words :

“The complainant on the issue here assumes the burden
 “of proof, and must, I think, as the evidence stands,
 “maintain it by a clear and undoubted preponderance of
 “proof.”

In *Morgan vs. Daniels* this Court further added the following remarks, which are pertinent to the case at bar and refer to—

“the rule which controls a chancellor in examining a
 “report of a master, or to an appellate court in reviewing
 “findings of fact made by the trial court. There is always
 “a presumption in favor of that which has been once
 “decided, and that presumption is often relied upon to
 “justify an appellate court in sustaining the decision
 “below.”

See *Crawford vs. Neal*, 144 U. S., 585.

Camden vs. Stuart, 144 U. S., 104.

Furrer vs. Ferris, 145 U. S., 132.

The reasoning in the opinion in *Morgan vs. Daniels* points out the decided tendency of the courts to sustain departmental decisions on questions of fact, and to hold them as conclusive and final in the absence of testimony sufficient to produce a clear conviction that the Patent Office or the departmental tribunal erred in its conclusions of fact; and that the burden of so proving is upon the party controverting the departmental decision, and that such party must establish the error beyond any reasonable doubt.

If this is the rule applicable to cases in which a defendant, under a plea of want of novelty, attempts to overcome the prima facies of a patent, or when the plaintiff in a suit under Sec. 4915 attempts to overcome a decision adverse to him in an interference before the Patent Office; or is the rule in a suit to set aside a judgment (as in *Butler vs. Shaw*, 21 Fed. Rep. 321), or in a contest between two claimants for land patented by the United States to one of them (as in *Johnson vs. Towsley*, 13 Wallace 72), very much more pertinent is the rule to the case at bar in which (apart from the evidence showing a decision of the Patent Office on the issue of identity of construction, in favor of the defendant by the grant of a broad patent to him), the burden of proof is upon the plaintiff upon the same identical question under the issue of infringement which he tenders by the allegation of his bill of complaint. In other words, the burden of proof to sustain the charge of infringement is in every case upon the complainant and this burden is not discharged by evidence of a character which leaves the question uncertain or doubtful. But even if the testimony offered under such an issue in the Courts is sufficient to create a probability that the affirmative of the issue is true, then under the rules laid down in the cases cited, this effect of the evidence is entirely rebutted and wholly overcome and the burden of proof shifted, by proof of a decision by the Patent Office Department deciding the identical question by a grant to the

defendant of a patent for the identical machine in controversy, especially when, as the record discloses in this case, it was so decided after consideration of the plaintiffs' patent charged herein to have been infringed. The rule in *Morgan vs. Daniels* has been recently applied in *Cartridge Co. vs. Peters* by the Court of Appeals in the Sixth Circuit, 78 O. G., 621, in an able opinion by Judge Lurton delivering the unanimous opinion of the court, in which the learned judge said, in concluding his opinion, that—

“the complainant has not produced that thorough conviction that he is the first inventor of these improvements, which he must do to justify a decree annulling the deliberate and well-considered action of the Patent Office. * * * There are many inexplicable things tending to cast a doubt as to who was the first inventor. * * * On the whole case, however, we lean to the correctness of the judgment of the Circuit Court and of the action of the Patent Office. This mental attitude is one which requires that the decree of the Circuit Court shall stand.”

This doctrine, however, is not new. It is fairly inferable from the reasoning of Judge Clifford in *Corning vs. Burden*, 15 Howard, 252, and of Justice McLean, on circuit, in *Brooks vs. Bicknell*, 2 McLean, 432.

As, however, the decision of the Patent Office is not conclusive, though presumptively correct and decisive in the absence of evidence which fully meets and rebuts it, the court is, therefore, brought to consider and weigh the evidence for and against the correctness of the decision of the departmental tribunal.

A Brief Comparison of the Plaintiffs' and Defendants' Machines.

Let us disregard form and look only at the principles of construction and operation of the two machines respectively, keeping in mind at the outstart the fact—essential to a correct conclu-

sion—that both parties utilize and retain, as a distinctive element in their respective combinations of mechanism, a “triple-valve,” such as shown in patent 220,556 and other prior patents. Both have *now* produced a quick-action machine, evolved from these prior devices; and in such new machine of both parties, the mechanism necessary to perform *all the old triple-valve functions*, are substantially identical, and these are old, and these the world has a right to use, and these remain in *both* the machines of the plaintiff and defendant respectively and operate to perform their usual functions as *triple-valve* mechanisms. They have not been altered or added to in any respect to change or qualify their triple-valve functions in either machine. The mere fact that both parties desired to produce the same additional result, and that both succeeded in that respect, is not of the least importance in determining the question at bar. What we wish to know is, whether or not each party added mechanism to the old device, which produces the new result *in the same way* and by *analogous means involving the same principles* of construction and operation. If they did not, there is no infringement, even though their respective devices produce identical *results* and are *functional* equivalents in that respect.

Recalling to the mind of the Court that the plaintiffs' machine consists of “additional members,” as he calls them, “combined” with the old triple-valve of his prior patent, 220,556, forming two machines in one casing, (the old machine venting auxiliary-reservoir-air as before, and the new or added machine venting only train-pipe air *without passing such air through the old machine*) we find by comparison therewith that the defendants' machine does *not* consist of “additional members” added to the old triple-valve, and thereby constituting *two* machines combined, but it consists of *one* machine, and that the old one, improved, and improved in a part which never before by any one in the world was ever thought could be improved or modi-

fied, viz., by separating the triple-valve chamber into two chambers communicating with each other through a restricted opening; in plain words, inserting a *bushing* or *partition* therein, and so producing differential pressures in the chamber on either side of said partition, by which the *old main-valve* of the triple-valve is made to simultaneously vent both auxiliary-reservoir air and train-pipe air to the brake-cylinder.

This was a great invention by Mr. Boyden. It was a discovery; a revelation of the latent powers of the old machine, made wonderfully effective by the most simple change, and in a part of the device never before attempted to be modified, and which the skill of the mechanic would never suggest to him to alter, add to or modify to produce the effect sought for. The means adopted to produce the effect obtained, *i. e.*, differential pressures, producing the desired effect, could never be *reasoned* out from anything then known in the art; certainly not from anything contained in the plaintiff's patent. It was a most ingenious invention, simple though it is, and the widest possible departure from the principle on which 360,070 is constructed.

No one skilled in the art or otherwise could, from anything contained in the plaintiff's patent, construct or evolve such a structure as Boyden's. The patent in suit does not teach the principles—much less the mechanisms—contained in defendant's machine, and it was never *intended* to teach it, or anything even remotely resembling it, either in construction or operation.

No person, with an understanding of the patent in suit, can logically contend that Westinghouse meant, by anything said therein, to include a triple-valve device in which the *main valve* of such was made to *vent train-pipe-air* or to vent it through the *triple-valve-chamber*, and any person attempting such a change, without also combining with it Mr. Boyden's partition in the valve chamber, would make an inoperative structure that would be worse than useless.

In other words, if we abandon the principle of segregated machines, as defined by Westinghouse patent, we *must* apply the Boyden principle in the reconstruction of the valve-chamber.

This is a leading, forceful and predominant *fact*, and it governs the decision of the question of identity or non-identity.

**The Construction of the Patent in Suit is to be
Qualified and Not Broadened, by Reason
of the Fact that the Device, However
Meritorious in Theory, is Not in
Practical Use.**

Confessedly the invention of the patent in suit, as shown and described therein, is not now made and sold by the plaintiffs, and has not been since 1887 or 1888. (Record, p. 149, line 36.) The reason for its abandonment appears clearly from the evidence in the record (page 126, line 6), and from the remarks of the judges in the New York cases (59 Fed., 594, affirmed, 63 Fed., 962-969); and although it is an operative device, it did not meet the public demand *without the improvements afterwards patented* in Westinghouse's later patent, 376,837. The defendant (Boyden's) device, on the other hand, admittedly operates as efficiently as the *latter*, and is not open to the objections to the former (360,070). The plaintiffs' contention, therefore, seeks to broaden the scope of a *paper* invention, and of the indefinite claim 2 of the patent therefor, to repress a mechanically different thing with which it cannot successfully compete.

In *Long vs. Pope Manufacturing Co.*, 75 Fed. Rep., 635, where the bill was dismissed by the Circuit Court in a case for alleged infringement of a patent which the plaintiff sought to broaden by construction to include the defendant's device, the Court of Appeals, in the First Circuit, in an able opinion by Judge Putnam sustaining the decree below, said :

1. " This patent was taken out in 1862, and, so far as it comes in issue here, it has not been put into practical

"use. Therefore, in determining the inventor's conception of the functions of the claims in issue, of the condition of the art, and of the improvement which he gave to the public, our safest resource, after so long a lapse of time, is the patent itself." * * *

2. "If the functions of the invention were solely those stated in the specification, the claim must clearly have a narrow range, while if the other function now suggested is permitted to aid in controlling its construction, it is entitled to a broad one. It is plain, nevertheless, on all rules, that so much of the mere form given in the specification, drawings and claim, is essential and must be retained, as is necessary in order to accomplish all the functions expressly enumerated therein. * * *

"A function afterwards discovered cannot be used to broaden it, and such a function is available to the patentee only when the patent, construed in the light of the circumstances existing when it is applied for, is broad enough to embrace it. In the case at bar there is nothing to show that the function now claimed for the invention was in the mind of either the inventor or of the Patent Office when the patent issued." * * *

3. "If this invention had been put in early use, and so continued with a long public acquiescence, it might perhaps have safely received therefrom a practical construction more favorable to the complainants. But in view of the rapidity with which mechanical improvements advance in this age, it would be a dangerous precedent to give to a mere paper patent, which has lain dormant for years, a breadth not contemplated on its face by reason of some new function discovered long after its issue, and after that function had been availed of in practice by others. There appear in this case some elements which perhaps would render it not inequitable to permit that result here; but the precedent, if established, would, on the whole, operate more to entrap honest manufacturers than to advance the useful arts."

The principles stated in the foregoing opinion (which has been divided into paragraphs for convenience of comparative reference) are applicable to the case at bar. The device described in the Westinghouse patent in question, has admittedly not been manufactured since it was superseded by the improvement thereon described in the later Westinghouse patent No. 376,837 issued in 1888; it admittedly contained defects which the latter remedied, and which superseded it. This is so clearly shown by the evidence in the Record, and by the opinions of the New York courts that it cannot now be successfully explained away or controverted. Against the principle stated in paragraphs 1 and 2 above, it is sought now by the plaintiffs to give to the machine, through its piston, a new function not contemplated by the inventor nor disclosed in the patent. As said by Judge Putnam, "so much of the mere form given in the specification, drawings and claim is essential, and must be retained, as is necessary in order to accomplish all the functions expressly enumerated therein." Hence, if the plaintiff's contention is correct, that the invention is broad enough in scope and intention to include dispensing with the auxiliary valve and giving the main valve the additional function of admitting train-pipe air, by reconstructing the valve-chamber of the triple-valve element of the combination, or is broad enough to dispense entirely with the segregated passage-way, "directly admitting train-pipe air to the brake-cylinder by utilizing the valve-chamber of the 'triple-valve' element of the combination for that purpose, or is broad enough to include a combination with the 'triple-valve' element of the claim, of "a device for admitting air *directly* from the main-air-pipe to the brake-cylinder" (the rejected and erased claim), or is broad enough to cover, not a combination with the triple-valve element of some *added* part or parts (through which the train-pipe air is vented), but a device which consists solely of a reconstruction of the triple-valve element itself and not employing any of the 'additional

members' described in the specification or any substitute therefor, and which 'triple-valve' element retains all its old valves which also retain all their old triple-valve functions of admitting reservoir air, but perform an additional function, not because of any change in them but solely because of a restricted partition in the valve-chamber of the "triple-valve" element, it is very certain that the patent does not disclose in its specification and drawings as part of the invention, this giving of a new function to the old valves of the "triple-valve" element, and which, as Judge Putnam remarked in *Long vs. Manufacturing Co.*, under similar circumstances above referred to, had been discovered and put in practice by these defendants *after* the issue of the patent in suit, and which would be giving to such patent a breadth not contemplated on its face, as inclusive of an invention not in the mind of the inventor when he made his application, and a scope not contemplated by the Patent Office in the consideration and allowance of the claims in controversy, and finally as establishing a precedent which, as Judge Putnam said, "would operate more to entrap honest manufacturers than to advance the useful arts."

The Construction of the Claims as Deduced from the Face of the Patent.

The patented mechanism consists of a brake device, having for its foundation or principal element in the new combination a triple-valve device such as described in the Westinghouse patent No. 220,556. This device operated to admit air pressure to the brake-cylinder solely from the auxiliary-reservoir. To this device, as so constructed and operated, and without any material change therein, either in its parts or in the mode of operation of any of its parts, or in any of the triple-valve functions performed thereby, the patentee of 360,070 (the patent in suit) *added* two elements, viz, an auxiliary-valve (marked 41)

and a passageway (marked 46) controlled thereby. This valve 41 was purely *auxiliary*, not only in mechanical construction and mechanical operation, but in the function performed thereby; hence (as stated in the patent) it was *independent* of the main valve, and could be plugged up without in any manner affecting the action of the triple-valve, or any of the ports or passages of the latter, and necessarily, in a machine constructed on that principle, the passageway 46 is separate from the triple-valve proper and leads *directly* from the train-pipe to the brake-cylinder.

From the patent in suit we extract the following:

"So far as hereinbefore described, the triple-valve
 "accords in all substantial particulars with, and is adapted
 "to operate similarly to those of my letters patent Nos.
 "168,359, 172,064 and 220,556, and in order that it may
 "perform the further functions requisite in the practice
 "of my present invention, it is provided with certain
 "*additional members.*"

No one can read the specification of the patent in suit without reaching the conclusion that the *essence* of the invention consists in combining *two separate and distinct* machines, in such manner that the old one will, under certain circumstances, *i. e.* when quick action is desired—bring the new one into action, *which latter performs no function whatever of the old triple-valve machine.*

We shall not take up the time of the Court discussing the question of pioneer patents and rules for considering claims therein. It is sufficient to say that under the decisions of this Court (notably *Morley vs. Lancaster*, 129 U. S., 263), no matter whether the *function* performed by the new mechanism is entirely new or not, and no matter how broad is the range of equivalents to be permitted in determining identity of mechanisms, it cannot be, and never has been, sanctioned by this Court that a defendant's device infringes such a patent, even if it perform precisely the same functions, unless its *mechanism* is constructed and operates on the *principles* disclosed in the patent

in question. Indeed this Court has distinctly said so in *Morley vs. Lancaster* in these words (see page 266 of the report).

“The Morley claims are not for a result or effect, irrespective of the means by which the effect is accomplished. It is open to a subsequent inventor to accomplish the same result, if he can, by substantially different means,”

and affirming (*McCormick vs. Talcott*, 20 How., 402), which was a suit on a pioneer patent, the Court said that mechanism will not be held to infringe it unless it “operates on the same principles and performs the same functions by analogous means or equivalent combinations.” In *Morley vs. Lancaster* the defendant’s machine was held to infringe because this Court found that the mechanical devices used by the defendant were known substitutes or equivalents for devices employed in the patented machine to effect the same result; and this language was used by this Court in defining the term “known equivalent” in reference to a so-called pioneer machine.

Scope and Meaning of Claim 2.

Referring again to the face of the patent in suit, to recall the “additional members” which Westinghouse “combined” with the old triple-valve of 220,556 to make up his invention of the patent in controversy, what construction can we put on the claim 2 in question from the information given by the specification and without other aid?

Let us read it, to be reminded that every element expressed in it, even to the “further traverse” of the piston, is old, both singly and in the same combination, in the old triple-valve of 220,556, the only new thing expressed in the claim being the statement of the *function* of the “additional members.” (See R., p. 468 :

“2. In a brake mechanism the combination of a main-air pipe, an auxiliary-reservoir, a brake-cylinder, and a

"triple-valve, having a piston whose preliminary traverse admits air from the auxiliary-reservoir to the brake-cylinder, and which by a further traverse *admits air directly from the main-air pipe to the brake-cylinder*, substantially as set forth."

It cannot be logically contended that the claim is comprehensive of means generally, irrespective of its construction or mode of operation, except that it is brought into action by the "further traverse" of the triple-valve piston. We are obliged to import into the claim *some* means to enable the triple-valve piston to perform this *abnormal* or *additional function*; otherwise the claim read literally would be for an inoperative combination and incapable of producing the desired result. This is true for two reasons: (a) because the function of the triple-valve alone is *not* to admit train-pipe air *directly* to the brake-cylinder, nor is it capable of such action, whether on a partial or a full traverse of the piston; and (b) because the triple-valve proper has no ports or passages leading from the train-pipe side of the triple-valve piston chamber *directly* to the brake-cylinder, and consequently, the triple-valve piston (without such ports) could not be capable of "admitting air directly from the main pipe to the brake-cylinder" by "a *further* traverse," or any other kind of traverse.

If there is any mechanical proposition in this case that is not disputed or open to dispute, it is that the "triple-valve" element of the invention in question, is the *same* triple-valve element of the preceding patents mentioned, nothing more and nothing less, and not performing any new, different or other function, *as such*, than it performed when alone and used simply as a triple-valve. Its piston only co-operates in the device patented, to produce the result recited in the claim, because in the performance of its ordinary, usual and old function, its *further traverse* contacts with and moves a new "auxiliary-valve 41" located in its path in the valve casing, which valve normally

covers a port 42, which opens a passageway 43-46 leading to the brake-cylinder. These "additional members" and the arrangement of them in juxtaposition to or in the path of the triple-valve piston (and wholly disconnected therefrom) in the valve casing, is the entire invention.

Indeed, the patent in suit says so, in those words: because after describing in nearly 2½ pages the construction of the old triple-valve proper, then follows (in exactly 22 lines of the patent, and on lines 5 to 27 of page 466 of the Record) the description, *and the only description in the entire specification*, of the construction of the "additional members" with which the old triple-valve of 220,556, is "provided" as aforesaid. The remainder of the specification is taken up with description of the operation of the device, defining triple-valves, and a disclaimer.

Reasoning by exclusion, it is nowhere shown in the specification, that *other means* than the auxiliary-slide valve 41 and the by-passage 43 and 46 may be employed to carry the air *directly* from the *train-pipe* to the *brake-cylinder*.

Beyond doubt the plaintiff is entitled to a broad claim for *this combination*, covering a wide range of mechanical equivalents, but he is not entitled to such a broad construction as to cover *any* and *all* mechanism involving the principle of admitting train-pipe air direct to the brake-cylinder when the old and usual "further traverse" of the triple-valve piston take place. To so hold would deprive any other person from improving or changing or adding to the old triple-valve of the automatic brake, by mechanism integral therewith, and wholly different in principle of construction and operation from the plaintiff's added elements, which will effect the *same result*. The authorities do not countenance any such theory of construction of patents for inventions, whether correctly classed as pioneer patents, so-called, or not.

Having thus ascertained the nature and scope of the invention, from a reading of the specification, let us see whether or

not our views are corroborated by a reference to the file and contents of the application therefor.

The Scope and the Meaning of Claim 2, as Qualified by the File and Contents of the Application.

The record (see pages 705, 714) discloses that the application, as originally filed, contained a claim and statement which will now be quoted, as they are controlling factors in the correct interpretation of claim 2. This *original* claim and this statement were erased by the applicant after rejection of said claim, and of claim 2 now in issue. The statement erased is as follows (R., p. 714):

"Further, while in the specific construction described and shown the function of admitting air from the main pipe is performed by a valve *separate* from that which effects the preliminary admission of reservoir pressure to the cylinder, a modification in which the same office is performed by a valve *integral* with the main-valve and *formed by an extension thereof*, would be included in and embody the essential operative features of my invention."

The original (1st) claim erased, was as follows :

"1st. In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder, and a "triple-valve, *provided with a device for admitting air directly from the main air-pipe* to the brake-cylinder, substantially as set forth."

The effect of the erasure of said statement and claim is, in law, a disclaimer that the valve element of the combination to admit train-pipe air to the brake-cylinder may be *integral* with the main-valve of the triple and merely *brought into operation* by the piston—in fact, it is an implied admission that it must be separate and independent from the main-valve, moved and brought into register with a

separate, independent and auxiliary port and passage-way (wholly disconnected from the triple-valve element) leading through the casing or chest from the train-pipe direct to the brake-cylinder. This view, if it needed any corroboration, is found in the *letter of applicant* to the Patent Office, accompanying his action *erasing said statement and claim*, in which he said (see Record, page 718, folio 1175):

“It is to be understood that applicant does not seek to broadly claim a device for admitting air directly from main-air pipe to the brake-cylinder. * * * When, however, the triple-valve is *provided* with an *auxiliary-valve*, operated by its piston which performs a new function additional to that of the triple-valve as previously employed, it is believed that *such combination* is wholly novel.”

This statement conclusively implies an *auxiliary-valve* in claim 2. But the contents of this file containing this letter absolutely preclude the possibility of construing the allowed claim 2 (allowed *after rejection*, allowed *after erasure* of above broad statement, allowed after erasure of this original first claim, and allowed *after receipt of this letter* defining the invention of *this claim 2* as a “*combination*” of an “*auxiliary*” valve with the old triple-valve, the piston or its “further” traverse being the actuating means), as being for *means generically*, operated by the piston of the triple; and which may be *integral* with the main-valve of the triple, or that the Patent Office intended to grant any such claim.

The Circuit Court recognized the force of this, but avoids its usual, proper and required effect by accepting the complainants' proposition, that the aforesaid *statement* in the specification was erased *because the drawings did not show a device which would warrant such a description*; yet that Court says, the patentee may nevertheless claim that his patent covers such a construction if his *invention* is broad enough to include it.

This is a very startling proposition in the law of patents, and remarkable for its novelty and departure from a line of decisions which are too well established to be so easily qualified or overruled. There is no better established principle in patent law at this day than that the doctrine of equitable estoppel is applicable with full force and effect to forever prevent a patentee who has, pending his application in the Patent Office, erased a broad statement of invention and a broad claim founded thereon, whether voluntarily, but more particularly *after* rejection and objection by the Patent Office, as in this case, from ever afterwards asserting for the remaining claims or any substituted claim, a construction or interpretation which shall be tantamount in scope and comprehensiveness to the original and erased statement and claim.

Sheppard vs. Carrigan, 116 U. S. 593.

Sutter vs. Robinson, 119 U. S. 530.

Roemer vs. Peddie, 132 U. S. 317.

Yale Lock Co. vs. Greenleaf, U. S. 554.

Crawford vs. Heysinger, 123 U. S. 589.

Corbin Lock Co. vs. Eagle Lock Co., 150 U. S. 38.

The decision in *Reese vs. Sewing Machine Co.*, 61 Fed. Rep., 958, affords no countenance for any qualification of this salutary rule; besides, the facts in that case have no parallel with those in the case at bar.

Westinghouse's application was filed November 19, 1886, containing the above quoted statement and claim. That erased (1st) claim and the (2nd) claim now in controversy in this case were both rejected. The Circuit Court seemed to think that the prior reference on which the claims were rejected did not in fact operate to negative the novelty of said erased claim, but that the erasure thereof was for the reason hereinbefore referred to. The Circuit Court was entirely in error in this; but whether it was or not is entirely immaterial. The applicability of the doctrine of estoppel is not limited to cases in which the party

happens to rightfully exercise his right of express or implied disclaimer. It is not dependent upon whether his *judgment* was right or wrong, but upon his act. It would be remarkable indeed, if the deliberate act of a party cancelling a broad claim and a broad statement of invention in the performance of a public act of patenting an invention, where his act is purely *ex parte*, could afterwards declare that his act was a *mistake of judgment*, or that it was done for some reason not apparent on the record, and evidence of which rests only *in pais*, and is not accessible to the public. The latter is entitled to be told *plainly* by the record, as Justice Miller said in *Merrill vs Yeomans*, and Justice Bradley repeated in *Keystone Bridge Co. vs. Phœnix Iron Co.*, *what it is that limits its rights* and what exclusive privileges have been carved out and given to the patentee by the monopoly granted.

It will be observed on reference to the file wrapper and contents of the application (see Record, page 714, folio 1166) that the *original* claim 1, which was erased, was in the following words :

"1. In a brake mechanism the combination of a main
 "air pipe, an auxiliary reservoir, a brake cylinder, and a
 "triple valve *provided with a device* for admitting air
 "directly from the main air pipe to the brake cylinder,
 "substantially as set forth."

The second claims was, and is :

"2. In a brake mechanism the combination of a main
 "air pipe, an auxiliary reservoir, a brake cylinder, and a
 "triple valve *having a piston whose preliminary traverse*
 "*admits air from the auxiliary reservoir to the brake*
 "*cylinder, and which by a further traverse* admits air
 "directly from the main air pipe to the brake cylinder,
 "substantially as set forth."

The words contained in each of these claims not found in the other are printed in italics for the purpose of ready comparison, and from which it will be seen that they do not differ in substance, when it is considered that the "further traverse" of the

piston is old, and existed in the combination expressed in the 1st claim as much as it does in the 2nd. The two claims are, and doubtless were intended to be, broader than the remaining claims, and the language of the first clearly indicates that it was intended to be broader than the 2nd, because it claims a triple valve provided with means generally, i. e. *a device of any kind* operating to perform the particular function or result stated in the claim, which is the *same* function or result stated in the 2nd claim.

The record shows that this original claim 1, as well as the present disputed claim 2, precisely as the latter now appears in the patent, were rejected by the Patent Office on reference to Boyden's earlier patent No. 280,285, of June 26, 1883.

Following this letter of rejection, the applicant acquiescing therein as to said claim 1, erased the said claim and substituted therefor the present limited and comparatively narrow claim 1 (see file wrapper and contents Rec. pages 717-718) and at the same time erased from the specification the statement quoted, that the "separate valve" could be integral with the "main-valve," and explained that *claim 2* implied the presence of an "auxiliary" valve in "combination" with the triple-valve, in the letter to the Patent Office asking reconsideration and allowance of said claim 2 (see Record, page 718, folio 1175). It is impossible to avoid the effect of this implied disclaimer. In the opinion of the Circuit Court the learned Judge uses the word "so-called" disclaimer, but uses it in reference not to this *erased* clause, but to an *inserted* clause at the end of the specification in reference to the Boyden Patent of 1883. The learned Judge discussed the effect of the Boyden prior 1883 patent, and the *inserted* clause, differentiating it from the invention in suit, but wholly omitted the most important implied disclaimer, arising from the fact that the broadening clause herein first above referred to, and the original first claim founded thereon *were deliberately erased by the patentee after objection and rejection* by the Patent

Office. It is these acts of the patentee which constitute the disclaimer and not the insertion of the clause to which the learned Circuit Judge referred, His opinion construed the 2nd claim in suit as covering, in the words of the erased 1st claim, every "triple-valve *provided with a device* for admitting air directly from the main air pipe to the brake-cylinder," provided it was brought into operation on the "further traverse" of the piston, erroneously assuming that such "further" traverse was *per se* new. Obviously he was wrong, and was correctly reversed.

It is wholly unnecessary for the purpose of the point we are now presenting, to discuss or decide whether or not the Boyden prior patent of 1883 anticipated, qualified or negatived the novelty, in whole or in part, of either of the claims in question. Suffice it to say that the applicant's attorney, at the time of making said amendments, and more particularly at the time of inserting the clause at the end of the specification differentiating said Boyden prior device, *accompanied the same by a letter* in which he refers, not only to the *function*, but to the *structure* of the Boyden patent, and admits in express words *that no claim is made to broadly admit train-pipe air directly to the brake-cylinder*, which, of course, means in a triple-valve device, for that is what the applicant was discussing and what he was distinguishing against. However that may be, he says in said letter, as plainly as the English language can convey the meaning, that his device consists of a *valve auxiliary* to the "triple-valve as previously employed," to perform an additional function, and that its novelty resided in a *combination* of such auxiliary-valve with the old triple-valve. No other meaning can be taken from the applicant's letter, which is as follows (see R., p. 718):

"When, however, the *triple-valve* is *provided* with an "*auxiliary-valve* operated by its piston, which performs "a new function *additional* to that of the *triple-valve* as "*previously employed*, it is believed that such *combination* is wholly novel."

There is nothing in this letter indicating any novelty in the "further traverse" of the piston as a new movement *per se*, because it has no further or other traverse than it had before. The effort was to show that one of the *old* movements of the piston does something which it did not do before **and solely because** of some "additional members" which it actuates on this movement. Every word of this letter indicates that the invention does *not* consist in some improvement *in and of the triple-valve itself*, but of a *combination* of the triple-valve with some *added* or *auxiliary-valve* whereby the *combined* mechanism (not the piston alone, nor the auxiliary-valve alone), may, through the action of the triple-valve piston, produce some new result or perform some new function; and it is "such combination" which the letter says the applicant believes to be wholly novel. And what is said in that letter is not disputed. What is disputed is that the 2d claim shall be construed to be for means which are *not* auxiliary to and not *independent* of the triple-valve as *preciously employed*; and for means which are *integral* with the triple-valve to enable it to perform a double function *in and of itself*; which latter is a character of structure which by no stretch of imagination could have been contemplated by the Patent Office officials, as intended to be within any claims of Mr. Westinghouse's patent as allowed to him; and is a construction of the claim involving wholly different principles of mechanical construction and operation; and which could not possibly be evolved from any description contained in the patent in suit.

Claim 2 is in Form and Substance for a "Combination."

We may be pardoned for referring again to the file and contents of the application for corroborative support of the following view of the claim in question. The letter of the patentee, Record, p. 718 (written after rejection and erasure of original claim 1 and present claim 2, and asking reconsideration and allowance of present claim 2, notwithstanding its previous

rejection), clearly shows (as does also the language of the claim itself), that the invention patented is a true *combination*, in the technical sense of that word, with a "triple-valve," of the "additional members" described in the specification, or their mechanical equivalents, which are to be "auxiliary" to the "triple-valve" and "independent of the main-valve" thereof.

The theory advanced by Westinghouse counsel that the idea of a "combination" may be brushed aside, is not sound, because not only is the claim in form for a combination, reciting the several elements thereof, but the claim uses the word "combination;" and the explanatory letter referred to says, "when, however, the '*triple-valve*' is provided with an '*auxiliary-valve*,' etc., it is believed that such *combination* is wholly novel." Is not the invention covered by this very claim (which is the one in dispute), therefore, by the force of these words, a true "combination" in the technical sense? How, therefore, can the new elements—the "additional members"—be wholly dropped out, and the "triple-valve" element (which the specification says is the well-known triple-valve of 220,556 with its graduating-valve and main-valve), be reconstructed to make its *same identical valves* do something which as valves of a "triple-valve" they could not possibly do, and hence make it a wholly different thing from the "triple-valve" expressly made a separate and distinct *element* of the *combination* patented? Moreover, such a substitution of a different "triple-valve" element breaks up the "combination" referred to in the applicant's letter, because it not only discards entirely the "additional members" referred to in the specification, or any mechanical equivalent thereof, or any substitute therefor, but it requires, in order to produce the result sought for, a remodeling of the valve-chamber of the "triple-valve" element in order that while retaining all its (old and usual) triple-valve functions, it shall be enabled thereby to produce the additional result sought for; and this reconstruction of *that element* the Patent Office has correctly ruled is the invention of Mr. Boyden.

Several Views Under which the Machines may be Compared.

1. It seems impossible to conceive of two machines so alike in results, and yet more widely and radically different in principle of construction and operation. No man could construct the defendant's device nor obtain the slightest aid in so doing, from anything contained in the plaintiff's patent, not even the patentee and co-plaintiff, Mr. Westinghouse, whom, it is not inappropriate to add, has not testified in this case nor attempted to assert to the contrary. This is a significant circumstance, and entitled to be considered, more especially if our contention be well founded in law, that the offer of defendant's patents in evidence rebutted the plaintiff's *prima facie* case and shifted the burden of proof.

2. Another principle—or rather maxim—of the patent law, is applicable here to aid us in determining this issue of fact viz.: the rule that what will infringe if later will defeat if earlier.

Let us, therefore, suppose that the triple-valve device of the defendant (which has no by-passage and no "auxiliary-valve," but in which train-pipe air is admitted to the brake-cylinder by a remodeling of the old "triple-valve" element), *preceded* Mr. Westinghouse's invention of the patent in suit, the latter would be the very first to state, that his invention was not anticipated thereby, because (he would argue), that taking his old "triple-valve" of 220,556 and *without remodeling it in any respect*, he made a new "combination" (in the strictest technical sense), with such "triple-valve" (and without thereby changing or adding to or subtracting from any of its parts or of the functions of any of its valves or chambers), of certain "additional members," in every sense (both physically and functionally), so *auxiliary* to the "triple-valve element of the combination that it must not be "integral" with the main-valve thereof (see statement erased from specification), and must be "independent" thereof. He could, therefore, truly and correctly contend

(if Boyden's device in suit preceded him), that the latter did not anticipate the "combination" of elements which he has thus shown and described in his specification, and pointed out in his claims—by *express words* in all the claims but the 2d, and by clear implication in the 2d claim, as was obvious to Judge Lacombe as stated in his opinion in 65 Fed. Rep. 99.

3. It seems almost a work of supererogation to cite other proof of differentiation, but let us, out of caution, do so. It has been seen that the plaintiff's device as shown and described has in combination a triple-valve, and added thereto a separate and segregated passage-way leading directly from train-pipe to brake-cylinder and a valve controlling it which is auxiliary to the triple-valve entirely outside of it, and *physically disconnected from it*; while the defendant's device has no additional passage-way at all, leading either directly or indirectly from train-pipe to brake-cylinder, and of course has no auxiliary or other valve to control a port or passage which has no existence, but consists, not of a "combination" with an old "triple-valve" element of some auxiliary device, but of the old "triple-valve" element remodelled by simply partitioning its piston chambers, whereby the old valve-chamber became a passageway not only for reservoir-air as it always was and still is, but for train-pipe air as well, and the main valve of the triple-valve not only admitted reservoir-air (as it always did and still does), but admitted train-pipe air as well on a full stroke of the piston. But this full or further stroke is the same action and for the same purpose as and for which it always was performed, *i. e.*, actuating the main-valve for admitting maximum reservoir pressure for emergency purposes. The mere fact that in plaintiffs' device another and auxiliary-valve is so placed *outside* the triple-valve chamber that on a full stroke of the piston it will strike such added valve, does not make such *old further traverse* a new function of the piston. The *combination* with such piston, having such a stroke, of an added element—a new valve—gives the *entirely* a

new function, but it is unsound and fallacious to say that the *further traverse* is per se a new function of the *piston*.

(4.) In view of what has been said, let us look at the collateral circumstances in respect of the *by-passage* controlled by this new *added* valve, the two constituting the "additional members" described in the specification. How can the plaintiff reasonably contend that the word "directly" in the claim does not imply a segregated passageway, and that "auxiliary" does not mean "additional" in respect of a valve which the description says is to be "independent" of the valves of the (old) "triple-valve" element in the "combination" pointed out in the claim? The surrounding facts preclude the possibility of any such contention being sound, and of these it suffices to mention the following only.

(A.) The disclosure is shown in Boyden's earlier patent of 1883 (four years in advance of Westinghouse's patent in suit), of a "triple-valve" of the slide-valve form, with a check-valve opening in its piston (exactly the same in that respect as defendant's present alleged infringing device), which operated *to admit train-pipe air through the triple-valve chamber* (such air being admitted, however, to augment the brake-cylinder pressure), thus showing *how* train-pipe air could be admitted to the brake-cylinder *through the triple-valve chamber* without any separate or additional passageway. THIS WAS FOUR YEARS BEFORE THE DATE OF THE PATENT IN SUIT. (See Record, page 498, and cut opposite).

(B.) To that earlier device, Mr. Boyden added in 1888 the further invention of producing *differential pressures* in the "triple-valve" chamber by means of a *partition* therein with a restricted opening, and so operated the old valves (not new or additional ones), of the "triple-valve" to admit train-pipe air in advance of or simultaneous with reservoir-air, and thus produced "quick action," so-called.

(5.) Before concluding the presentation of our views on this particular aspect of the cause, we desire to call the attention of the Court to, and to thank our learned opponents for, the very frank and truthful admission contained on page 7 of the Westinghouse Supplemental Brief, as follows:

"The two valves of defendant's structure are *both* capable of *admitting auxiliary reservoir air only*, **"when the partition 9 is absent**, because in the structure as thus organized, *there are no such air-passages* as to make it possible for **any movement** of the triple-valve piston to result in opening **any port** by which *train-pipe air* could be admitted to the brake-cylinder."

The following conclusions logically follow from this absolutely true fact, so admitted:

(a.) The defendant's structure (without the partition 9) has two valves—a graduating-valve and a main-valve—and a piston with two movements—a preliminary and a further—the first movement actuating the graduating-valve and the further movement actuating the main-valve; and this structure, *so organized* (without the partition 9) will admit only reservoir air to the brake-cylinder, *no matter whether the piston makes a preliminary or a full traverse*; and the defendant's device so constituted (without the partition 9) will neither produce the new result of the plaintiff's device (admitting train-pipe air,) nor in any manner interfere with the plaintiff's claim, taken in its broadest and literal sense; and finally, that this defendant's device (without the partition) is an operative "triple-valve" for admitting *reservoir air* (only) by means of two valves actuated by the two movements of the piston, respectively.

(b.) That the identity of *said device*, WHEN THE PARTITION IS PLACED IN THE VALVE-CHAMBER, with the Westinghouse invention in suit, is, therefore, dependent solely upon whether or not Mr. Boyden's reorganization of the *valve-chamber* of the "triple-valve" element, AND WITH NO OTHER CHANGE WHATSOEVER, is the *mechanical* equivalent of Mr. Westinghouse's

"combination" with a "triple-valve" (as an entirety and unaltered), of two other distinct elements (a separate passage-way 46 and an auxiliary-valve 41 to control it), the latter being in no sense any part of the "triple" nor affecting its action or function as *such*, but on the contrary being "additional members," distinct elements or integers, in a true "combination" of elements, some old and some new—to produce some *new* result?

(c.) This is exactly the proposition into which Judge Hughes crystallized the whole case when he said, in his opinion (R., p. 880).

"As there was no novelty in the extreme traverse of the old triple-valve piston, it must be eliminated from consideration and the mechanical equivalency of Boyden's device of the partitioning ring integral with the triple-valve itself, on the one hand, and on the other hand, the Westinghouse device attached to the triple-valve, and consisting wholly of apparatus not integral, but segregate, individual, several, *additional to and independent of it*, depends upon the character of the two devices themselves, considered and *compared apart from* the extreme traverse, and not upon their being put in action by the extreme traverse *of the triple-valve piston*."

And this proposition he repeats in a paraphrased sentence on previous page (878), premising it by the statement that it is "the question at bar" thereby expressly saying that it is *the* question, the decision of which ruled the decision of the case and constituted the matter adjudicated.

His answer to his own question thus tersely put, twice in the opinion was "that they seem to us to differ as widely from each other as two devices for accomplishing the same result can well differ." (R., p. 880, folio 1419.)

He was undoubtedly correct. And his conclusion is corroborated by the paragraph we quote above from page 7 of plaintiffs' supplemental brief.

Comparison of the Devices by Comparison of the Functions of Their Pistons.

The error underlying the Westinghouse argument to show "substantial identity" is that while they admit that the "further traverse" of the piston is *per se* old, they argue that it performs a new function when it actuates *any* valve and opens *any* passage to produce the *new result* of admitting train-pipe air.

Their contention in this regard is untenable, (1) because so broad a construction amounts to a reinstatement of the rejected and erased original claim 1 for the "combination" with a "triple-valve" (having *two movements* of its piston) of "*a device*" for admitting, &c.; and (2) because while it is true of the Westinghouse machine that its "further traverse" of piston does something which it did not do before, *it only does it because* of the true "combination" therewith of an *added* valve and an *added* passageway. But it is not true of the Boyden machine, because it is PHYSICALLY IMPOSSIBLE for HIS piston to do something which it did not do before, for his piston has the same two movements it had before, *it controls the same two valves it did before and in the same way*, and it is not combined with nor does it actuate any new or added valve, nor control any new or added air-passage, and, in fact, does nothing more nor less than it did before, but simply actuates the old valves which governs the same old "triple-valve" passages that they always controlled and exactly in the same way.

Obviously it is the *partition* in the valve-chamber (producing differential pressures), and not the partition plus the *piston*, that produces the new function or result in Boyden's machine. It is not even true that these differential pressures are produced only on a movement of the main-valve 22, which occurs on the further or full traverse of the piston; but if it were so, it still would not sustain the plaintiff's proposition (as respects the

Boyden machine), that this further movement of the piston is the primary cause or in any manner aids in the production of the new result, because this further movement of the piston does not co-act with the partition, it co-acts with the *(old) valves* and only *in the same way and exactly for the same purpose as before*. Take the partition out of the device and the fact is demonstrated to an absolute certainty.

The plaintiffs have confounded the principle of their own machine with ours in respect of the alleged new function performed by the piston, because, in respect of theirs, their contention is quite true—for in theirs the piston on its further traverse does something which it did not do before—it contacts with and moves a *new* valve, and which thereby opens a *new* air-passage; but it is a mistake to say, even in respect of *their* machine, that it is the further traverse alone which produces the new result of admitting train-pipe air, because obviously it is the result solely of the “*combination*” with such “further traverse” of an *added valve* and an *added* air-passage, *all of which co-act*, and *must* co-act to do this new thing.

On the other hand, in the Boyden machine the *piston* does not co-act with any new valves, *for there are none*; and it does not, either directly or indirectly, open any new passageway, *for there is none*; and surely it does not co-act with the partition, nor does it co-act in any new way with the *main-valve 22*, to produce this *new result*, in that it moves *that* valve only on its further traverse, for the very obvious reason that it opens *that* valve now, exactly as it opened it before (in prior triple valves) to wit, on its “further traverse,” and *only* on its further traverse.

Some notice ought to be taken of the assertion in Westinghouse supplemental brief, pp. 6 and 7, that the Boyden device, if stripped of its partition, is a “structure which no one uses or wants to use.” We might truly say the same thing of plaintiff's automatic device of their patent 220,556, if we add—when they (the public and users) can get either of the improved devices of either of the patents in conflict in this case. It is to be

observed, also, that the plaintiffs do not attempt to deny, (1) that the device (without the partition) is a perfectly practical and useful automatic triple-valve; (2) that it has two valves and two movements of its piston, operating said valves in the manner already stated; (3) that it is free to be used by anyone since patent 220,556 expired; (4) that it contains the principle of delivering reservoir-air by means of a graduating-valve and a main-valve, the former doing ALL the *graduating work* and the latter doing none of it, and acting only for "full and emergency application" work, and then only on a further or final traverse of the piston. This is the principle and mode of operation of the expired patent 220,556, and we challenge our learned opponents to deny it or qualify it; and we further assert that Boyden's device (when stripped of its partition) becomes a practical and useful and complete embodiment of the device of the expired patent 220,556; and which assertion it would not be left to us to make, if that patent was still in force.

But, suppose this was not so, this court will be unable to find anywhere in any of the briefs of our opponents a denial of our proposition, (which alone is the material subject) that the Boyden machine (if stripped of its partition) is equally with the machine of 220,556 a practical, useful and complete device to admit reservoir-air to the brake-cylinder, both for graduation or service, and also for emergency work.

The argument made in Westinghouse's supplemental brief that the "triple-valve" which Boyden improved by partitioning its valve-chamber, is a device unknown in the prior art because it has two valves and not one valve, is erroneous for two reasons: *First*, because patent 220,556 is expressly for a graduating-valve additional to the *main-valve*, both valves for *reservoir-air* admission, and *that patent is not confined to the slide-valve form*, but would include the poppet-valve form, as Westinghouse would quickly assert if the patent was still in force, and hence would include a "triple-valve" (without Boyden's partition) but

with his graduating-valve i, j, k and main-valve 22, as now used by him. *Second*, because, as correctly stated by Judge Morris (R., p. 846, folio 1367), that

“The use by Boyden of a central opening through the
“triple-valve piston to admit train-pipe air to the triple-
“valve chamber was not new, nor the use of a poppet-
“valve for the main-valve of the triple, both of these
“constructions having been shown in the Westinghouse
“patent 141,685 of May 24, 1873.”

Note.—Such a method of feeding-in train-pipe air *to charge the reservoir* was old, as the Judge says; and he might very well have added that such a central check-valved opening in the piston to admit train-pipe-air *to the brake-cylinder to augment the pressure, was old and was the invention of Boyden* and was described in his 1883 patent—the very patent on which this disputed claim 2 of Westinghouse’s patent in suit, was originally rejected, and against which Westinghouse distinguished in his letter by claiming that his (Westinghouse) device was a “combination” with a “triple-valve” of an “auxiliary-valve” &c.

The attention of the Patent Office was also called to this, by a paragraph in Boyden’s 1892 patent, No. 484,134, as follows (see R., p. 797):

“In my present invention I use the check-valved feed-
“passage of my 1883 patent, leading from the train-pipe
“through the triple-valve piston to the main-valve cham-
“ber, and thence both to the auxiliary-reservoir and the
“brake-cylinder, for the double purpose of supplying the
“auxiliary-reservoir and also enabling train-pipe air to be
“vented directly through the main-valve chamber into
“the brake-cylinder to aid in supplying the brakes in
“emergency stops.”

Comparison of the Facts in the Case at Bar with the Facts Involved in Burr vs. Duryee and Gill vs. Wells.

(See illustrations on folder, opposite p. 53 of this brief).

The opinion of Mr. Justice Clifford in *Gill vs. Wells*, 22 Wallace 1, suggests three several tests we may apply to the facts in the case at bar to determine the correctness of our general conclusions:

I. It was said by Judge Clifford that the dropping out in the reissue claim, of the tunnel or trunk for directing the fur to the cone, and substituting "means for directing the fur to the cone" made the reissue void as for a *different* invention. *Sem-ble*, it would have been held none the less a *different* invention if its identity had been the subject of inquiry as an alleged infringing device in a suit charging infringement of the original patent.

II. Let us now suppose that Westinghouse had amended and reissued his patent in suit (as Wells did), by eliminating the description of the segregated passageway leading *directly* to the brake-cylinder, and by dropping out the auxiliary or additional-valve and substituting therefor a description of and claim for a device (such as Boyden's), in which the "triple-valve" chamber was used as the so-called *direct* passage, and the *main-valve* of the triple employed not only to do its own work as before, but endowed with a new and *additional* function by a *remodelling of the valve-chamber of the "triple-valve" element* of the "combination" of the original patent, and by means not even remotely suggested in the specification and *solely whereby* one of the old valves performed a new function. Can it be doubted for an instant that this Court would say without the least hesitation, that such a reissue was for a *different* invention? It is none the less different because it is the subject of a subsequent original patent to a different person.

In *Gill vs. Wells*, 22 Wallace 1, the learned Judge considers the question of identity under the doctrine of equivalents, and states it thus :

“Whether one device is or is not an equivalent for another is usually a question of fact * * and the rule is that if the defendant omits entirely one of the elements of the patented combination, without substituting any other, he does not infringe, and if he substitutes another in the place of the one omitted, which is new or which performs a substantially different function, or if it was not known at the date of the plaintiff's patent as a proper substitute for the omitted element, he does not infringe.”

These remarks are pertinent to the case at bar, in which the “additional members” constituting the only novelty in the patented combination, are omitted entirely, and nothing substituted for them to perform their function, it being performed by mechanism operating on a different principle and not known at the date of the plaintiff's patent but invented afterwards.

III. Another view of the case at bar may also be taken. Beyond doubt a patent is a contract and the consideration for the monopoly is the description in the specification, not alone of the specific mechanism shown in the drawings, but a full, clear and exact description of its mode of operation, i. e., its principle of construction and operation, in order that the public may be able, after the expiration of the monopoly, to make, and use the invention in all the possible forms or modifications, embodying the principle or mode of operation disclosed, that would be suggested to a mechanic skilled in the art. Looking at this Westinghouse specification of the patent in suit, in that light, can any one fairly say that it teaches that the “triple-valve” element of the “combination” need not be the triple-valve in any of its various forms referred to in the specification, but may be a triple-valve provided with modifications (not described and not then known) to produce differential pressures therein and

thereby give different and additional functions to *its* valves, and that by so doing, the directions of the patent to provide an "auxiliary" valve "independent" of the triple, and a separate passageway leading "directly" to the brake-cylinder, *may be disregarded?* We fail to find anything in the specification which teaches this, and not a single person interested in the case, either party, witness or counsel, has been bold enough to assert that it does. Yet it is necessary that it should in order to find identity of the defendant's device with the machine of the patent in suit.

In *Burr vs. Cowperthwait*, 4 Blatchford 163, which was a suit on the Wells patent for a machine for making hat bodies, the Court (Ingersoll, J.), stated the rule of *O'Reilly vs. Morse*, (15 Howard 62, 119), as to functional claims, and applied it to the case there under consideration in language which may aptly be applied to the case at bar.

In that case the means or mechanism used by the defendant produced precisely the same *result* as the patented mechanism, and the functions of certain old parts of the two devices respectively were identical; but in the plaintiff's patent it was pointed out that it contained a channel or way interposed between the picker-cylinders and the revolving cone, combined with means to guide or direct the sheet of fur on to the revolving cone, which said guiding or directing elements (which distinguished the novelty of the machine), were found to be wholly unnecessary in the defendant's machine and not contained therein, although said machine produced the same results as the plaintiff's of directing the fur to the revolving cone, and the same variable thickness of fur by controlling the manner of feeding the fur. The Court held that there was no infringement. The same construction was afterwards given to a subsequent re-issue of this patent, in *Burr vs. Duryee*, 1 Wall. 531, and again on a further re-issue of the patent, in case of *Gill vs. Wells*, 22 Wallace 1.

After the decision on the Wells patent, in *Burr vs. Cowperthwait*, the patent was re-issued to cover, in the combination with the rotating exhausted cone, *means* for directing the fur therto, instead of the specific means formerly claimed and described in the specification. As thus re-issued, the patent was passed upon by this court in *Burr vs. Duryea* 1 Wallace 521, in which Justice Grier, delivering the opinion of the court stated several principles, aptly pertinent under a similar state of facts in the case at bar, as follows :

“An infringement involves substantial identity, whether that identity be described by the terms ‘same principle’ same ‘modus operandi’ or any other * * * .”
 “The argument used to show infringement assumes that every combination of devices in a machine which is used to produce the same effect, is necessarily an equivalent for any other combination used for the same purpose.”
 “This is a flagrant abuse of the term ‘equivalent’ * * * .”
 “To constitute an infringement it must be a copy of the thing described in the patent, either without variation, or with such variations as are consistent with its being in substance the same thing.”

In that case it appeared that the defects in prior machines resided in their want of means to *guide and direct* the fur to the revolving cone and deliver it thereon in variable thicknesses at different points. *It was conceded that Wells, the patentee, was the first to produce that result in such a machine ;* and great stress was laid upon that fact in the effort to induce this court to give a broad range of equivalents for the *expressed* novel element (in *Burr vs. Cowperthwait*) and to the re-issued 1st claim, (in *Burr vs. Duryea*), for the indefinitely stated “means for directing the fur-bearing current,” as the novel element in the combination made the subject of the re-issue claim.

In both cases, however, the courts refused to give undue effect to the so-called pioneership of the invention, as to make it cover “means generally” for directing the fur. It would

not have helped the patentee to have added "when operated or brought into operation by the driving mechanism," if such driving mechanism was old in such machines. No more can similar words, "actuated by the piston on its further traverse," help the plaintiff here to claim "means generally" for admitting train-pipe air "directly to the brake-cylinder." Such introduction of actuating devices into an otherwise indefinite claim do not help it out, when such actuating means are shown to be old and acting as such as they always heretofore acted in like machines, which differ from the patented machine only in not containing as an "additional" element, the "means" for producing the new or added function, in the new "combination" made up by adding to the *old* machine such new "means." In that case, the machine of the defendant, Duryea, was a machine patented to one Boyden, in whose patents statements were contained (exactly as in the Boyden patent in the present case at bar), that the object was to produce the same result as the Wells machine, but by discarding the Wells principle and mechanism, the words of *that* Boyden patent being quoted therefrom in the report, as follows, (1 Wallace, p. 562-563):

"This invention relates to an improved mode of directing or guiding the fur, as hereinafter fully shown and described, *whereby trunks and all other comparatively complicated appliances hitherto used for the purpose are dispensed with*, and an exceedingly simple and efficient device substituted therefor.

"The invention consists in placing directly in front of the picker a plate so bent or curved that its surface will have a certain relative position with the axis of the picker and the surface of the cone, and give such a direction to the fur as the latter is thrown on it by the rapid motion of the picker that the fur will be drawn properly on the cone by the exhaust or suction within it."

Later on in the opinion, this Court explained away the so-called "substantial identity" of the two machines, in its own language, differentiating it from Wells, as follows (see page 572 of 1 Wallace):—

"Now the machine of Boyden has not one of the peculiar devices or combination of devices of the Wells machine, nor any substantial identity with it, unless by 'substantial identity' is meant every machine which produces the same effect. These abstract phrases 'substantial identity', 'equivalent', 'mode of operation', &c. are often used in such a vague and equivocal manner that they mystify and lead many to absurd conclusions, who will not distinguish between things that differ. That two machines produce the same effect will not justify the assertion that they are substantially the same, or that the devices used by one are, therefore, mere equivalents for those of the other. There is nothing in the Wells machine, or its devices, which suggests the peculiar device employed by Boyden. His machine has no tunnel, no cap, no flap, nor any equivalent thereof, nor does it incorporate in its structure the substance of the first invention. There is nothing to be found in the specification of Wells which would ever suggest the peculiar device of the Boyden machine. As an improvement it has more claims to originality than that of Wells."

Later on in the opinion, the Court comparing the specifications of the plaintiffs' and defendants' patents, said (see page 573 of report):—

"No one who reads the two specifications, or inspects the two machines, can aver that they contain the same combination of mechanical devices, or substantially the same, to produce the desired affect. Not one of the devices, or its equivalent, used in one is to be found in the other, nor is its mode of operation the same. The argument used to show infringement assumes that every combination of devices in a machine which is used to produce the same effect is necessarily the equivalent for any other combination used for the same purpose."

It must be remembered that this finding was, notwithstanding the fact, as stated by Judge Ingersoll, and so argued in this court (page 551 of report), that "before the discovery of Wells, no machine was known or used that did, by *any means*, direct a sheet of fur on to a section of a revolving cone, * * to form a bat of fur on the cone, * * of the desired shape and thickness, * * at the will of the operator." And it may also be broadly and properly observed that the re-issue claim was for "means for directing the fur-bearing current."

This case has never been overruled, but, on the contrary, was followed, in a subsequent second re-issue of the same patent, in *Gill vs. Wells*, 22 Wallace, 1; and the same interpretation of the *actual invention* adhered to, notwithstanding the general, broad and indefinite language of the re-issue claim.

Strong efforts were made in *Burr vs. Duryee*, to urge upon this Court the so-called pioneership of the Wells machine, but this Court said, defining pioneership :

"We are of the opinion that the invention of Wells was * * not founded on any new discovery of the application of any element or power of nature to produce an effect. He was not the first to devise the application of a vacuum to a cone for the purpose of forming and compressing bats for hat bodies. * * He has improved this machinery by his peculiar devices * * combined in a machine which however failed to be automatic till further improved. * * As required by statute, he truly and correctly stated the principle or mode of operation of his machine and the functions performed by its several devices. * * He has a valid patent covering his whole invention—no more, no less."

These remarks in *Burr vs. Duryee* were made in respect of facts exactly parallel to those in the case at bar. It cannot be pretended that the Westinghouse patent in suit is a pioneer within the true definition above described; it cannot be pretended that it discloses for the first time the principle or idea of quickening the serial action of the brakes by venting the train-pipe

at intervals at or near each of them (R., p. 68, l. 7, and R., p. 759, l. 42); it is not pretended that the earlier Boyden patent (R., p. 498, l. 3) of 1883 (4 years ahead of Westinghouse) did not admit train-pipe air as well as reservoir-air to the brake-cylinder, and it is expressly admitted in the applicant's letter to the Patent Office, that it is not intended by his claim 2 to cover broadly the admission of train-pipe air to the brake-cylinder (R., p. 718, l. 37)—and of course he meant in a "triple-valve" device, for that is what he was distinguishing against, for he was endeavoring to show that Boyden's prior patent of 1883, for a triple-valve device in which train-pipe air was admitted to the brake-cylinder was not a quick-action device.

In the case at bar the plaintiff has strongly urged this Court to overlook differences in mechanism of the respective devices and obvious differences in their principle of construction and operation respectively, on the plea, whether true or not, that Westinghouse was the first to put into practical form a triple-valve device having additional members which performed the additional function of admitting train-pipe air to the brake-cylinder to quicken the action of the brakes. In other words, having, as he alleges, whether true or not, been the first to produce this result, he asks the Court to construe his patent so broadly as to cover every device to accomplish that purpose which is made a part of an old triple-valve, and operates in conjunction therewith. To sustain such a contention at this late day, would be to overthrow a long line of decisions to the contrary. Precisely the same claim and the same contention was made in *Burr vs. Cowperthwaite*, supra, in which the Court admitted that:

"It is clear that before the discovery of Wells' no machine was known or used that did by any means direct a sheet of fur on to a section of a revolving, exhausted, perforated cone or other form, parallel with the axis so as to form a bat of fur on the cone or other form, of the desired shape and thickness in properly regulated quantities at the will of the operator." * *

In that case the bill was dismissed, because the Court did not find in the defendant's machine the mechanism described in the patent, or the mechanical equivalent therefor to control or give direction to the sheet of fur carried by the current of air to the cone. Nor was there anything substituted therefor, it having been found in the defendant's machine (which was the same machine as in Burr vs. Duryee and Gill vs. Wells), that the current of air, which carried and directed the sheet of fur, was controlled by the picker-cylinders, *without the aid of the plaintiff's guiding or directing devices, or of any substitute therefor, or of any device, in fact, interposed between the picker cylinders and the rotating cone.* The Court said in its opinion that it was a complete and useful machine without any such mechanism or any guiding device being interposed between the parts named for guiding and directing the fur to the cone. The language of the opinion being as follows, (4 Blatch, 171):

"It is a complete and useful machine for forming bats
 "of fur on a perforated exhausted cone, without any
 "trunk or channel-way, or other device interposed
 "between the picker-cylinders, rotary brush or other dis-
 "integrating apparatus and the cone on which the bat is
 "to be formed. * * * Without such trunk, channel-
 "way or other device so interposed, the defendant's
 "machine is a perfect one complete in all its parts.
 "*Without it the plaintiff's machine would be use-
 "less.* In one machine the trunk, channelway or other
 "means so interposed is an *essential* means. In the other,
 "it is a *non-essential*. In one machine the trunk with
 "hinged hood controls the current of impelled fur in the
 "direction it should go. In the other other, the current
 "of impelled fur is directed and controlled in the way it
 "should go, by the power of the picking cylinders."

This case in its facts is exactly parallel with that at bar. The Westinghouse patent points out distinctly that it is *essential* to have a segregated or additional passage used to *direct* the train-pipe air to the brake-cylinder, and equally essential to

have an *auxiliary*-valve to control that segregated passageway, and also that the auxiliary-valve is no part whatever, either physically or functionally, of the triple-valve element in the combination, the same being "independent" of the main-valve thereof. In the defendant's, neither the by-passage, nor the auxiliary-valve to control it, are essential nor even useful, nor are they, or any substitute for them, present.

Exactly as in the hat body case, so the defendant here has found, that by using his system of *partitioning the valve chamber* of the triple-valve he can direct the train-pipe air, when required, *through the triple-valve chamber* and control it by the *valves of the old triple-valve*, and that he does not need the additional passageway and auxiliary-valve of the plaintiff's invention nor any equivalent therefor, or any substitute therefor, and, in fact, dispenses with them altogether. It would be difficult to find two cases more closely parallel in the essential facts controlling their decision. (See illustration and comparisons on folder.)

Comparison of the Findings of Fact in the Case at Bar, with Like Findings in Burr vs. Cowperthwait.

Ingersoll, J. in *Burr vs. Cowperthwait*, 4 Blatch (170):

"In defendant machine, there is no guiding trunk, "interposed between the pickers and the cone, to control "and give direction to the sheet of fur carried by the "current of air on to the cone. Neither is there anything "either as an equivalent to the guiding trunk, or in lieu "or in substitution thereof, or for any purpose, interposed "between the pickers and the cone."

Morris, J. in *Westinghouse vs. Boyden Brake Co.* (R., p. 838, folio 1365.)

"I am not satisfied * * * that the poppet valve "22, of the Boyden mechanism is such a (an auxiliary) "valve, for Boyden's poppet-valve 22 does * * * to

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"some extent perform the functions of a main-valve of
 "the triple, as well as the function of Westinghouse's
 "auxiliary quick-action or emergency-valve. * * *
 "Valve 22 will, if the engineer uses his break carefully,
 "do the work of a main-valve, as is *demonstrated*, I think,
 "by the experiments in which the sensitive graduating-
 "valve i j k was plugged up. So I take it that defend-
 "ant's valve i j k (40) must be held to be the sensitive grad-
 "uating-valve usual in triple-valve devices, since Patent
 "220,556, and the defendant's valve 22 must be held to be
 "the *main-valve*, and that in defendant's mechanism he
 "has been able, by an ingenious arrangement restricting
 "the admission of auxiliary-reservoir air to the triple-
 "valve chamber, to cause the *main-valve* to do both main-
 "valve work when needed, and to do quick-action work,
 "when needed."

If this be true, then the plaintiffs' proposition (on pages 47
 and 48 and repeated several times thereafter on pages 67, 73 and
 78 of their *principal* brief), that "the real 'main valve' of Boy-
 den is the valve i, j, k, (40), through which auxiliary-reservoir air
 is admitted for all practical purposes * * * and that stem-
 slide valve (i, j, k) is the true 'main valve' *cannot be true*."

The crucial test question was correctly put in the case at bar
 by Judge Hughes of the Court of Appeals (and correctly answered
 in the negative by him) as follows; premising his remarks by
 the statement, that:

"The transmission of train-pipe-air and auxiliary-reser-
 "voir-air simultaneously to the brake-cylinder is a result
 "or function and is not patentable." (Precisely as this
 "Court said of the hat body machine, in *Burr vs. Duryee*
 "and *Gill vs. Wells*, that the '*directing of the fur* from
 "picker to cone' was not the 'mode of operation of the
 "machine,' but the *result* of the use thereof). The mean-
 "(Judge Hughes says) by which this or any result or func-
 "tion is accomplished may be many and various and if
 "these several means are not *mechanical equivalents*,
 "each of them is patentable,' adding: 'The question at

"bar' is whether defendant Boyden's machine in which "the same result is attained (by a novel reconstruction of *the 'triple-valve' itself*), is the *mechanical equivalent* "of Westinghouse's 'attached machine,' non-integral, "segregate and individual consisting of another stem, "another valve, and by-passages peculiar to itself, leading "from the additional valve to the brake-cylinder."

After stating that this precise question was necessarily passed upon by the Patent Office in the grant to defendant of broad claims in his patent therefor, the learned Judge for the fourth circuit added that while such ruling was evidence of great weight though not conclusive, he fully concurred therein, and said:

R., p. 880. "Comparing the two devices apart from the "triple-valve piston in extreme traverse, we are unable to "entertain a doubt that the ruling of the Patent Office "was correct to the effect that Boyden's device was not "the mechanical equivalent of that of Westinghouse. "They seem to us to differ as widely as two devices for "accomplishing the same object can well differ."

"The plaintiff's contention is that Boyden's main-valve 22 is the equivalent of the Westinghouse "auxiliary-valve because, 'Boyden makes it perform the "same purpose.' But Boyden's 'poppet-valve' 22 (substituted) for the slide-valve (which) is the main-valve of "220,556. Boyden's is not an 'auxiliary-valve;' it is "mechanically the original main-valve of the original "triple-valve, and it performs the service which is performed by the main-valve of 220,556. It is not the "mechanical equivalent of (auxiliary) valve 41' (simply "because it performs an additional duty). 'The performance *incidentally* of quick-action service does not make "it an 'auxiliary-valve.' *It is the same valve.* The incidental service is auxiliary, but the valve itself is the "same and unchanged." (R., p. 881).

R., p. 882 "Obviously there is no 'auxiliary-valve,' "independent of the main-valve, in the Boyden device."

Summary of Conclusions.

The defendants do not infringe this patent upon any construction of claim 2, which would not require it to be defeated for want of novelty in its expressed combination of mechanism, or as claiming a mere function or result. In view of the prior art shown in the patent 220,556 and frankly admitted in the patent in suit, Westinghouse invented nothing but the segregated "additional members" making a new "combination" with an old "triple-valve."

Westinghouse proceeded upon the principle of *adding* a separate machine, without disturbing the "triple-valve" element functionally or physically. Boyden abandoned all idea of a separate machine, or a separate valve, or a separate air-passage, and commenced with the idea of using the *same* valves (retaining all their old functions), and the same passage through the triple-valve chamber (it retaining its old function of venting reservoir-air), relying solely upon his new idea and means of effecting differential pressures in the valve-chamber to effect the entrance of train-pipe air when his *main-valve* is opened by a full traverse of the piston to vent reservoir air (as before), for emergency or full-brake pressure work.

The plaintiff's contention may be fairly stated from their brief as follows:—Claim 2, they say, includes by implication (1) an "auxiliary" valve "independent of the main valve"; (2) a passageway capable of conducting train-pipe air to the brake-cylinder, without passing through the reservoir, and (3) a triple-valve, having at least one valve to control the reservoir port, and also a piston whose short traverse actuates the reservoir-air valve and whose full-traverse actuates the train-pipe-air valve.

In order to find infringement by defendants, they assert that the specification of the patent discloses sufficient to justify

calling the following remarkable changes "mechanical equivalents" of the three elements named; viz.:—

I. The "further-traverse" of the piston, while *per se* old and still retained for its primary purpose of actuating the main-valve, *performs a new function*, they say, because it moves an "auxiliary" valve which has been so located in the structure as to be actuated when such usual and old further-traverse occurs; although it is obvious from the mere statement of the proposition, that the new function, in so far as it involves any novelty or patentability (quoad the prior patent 220,556, which had the same movements of piston), is produced by the "combination" of piston **and valve**, and not by the piston alone.

II. That the "passageway" for admitting air "directly" from train-pipe to brake-cylinder, they say, need not be a *separate* passageway, but may be the valve-chamber of the "triple-valve", through which reservoir-air is admitted; although such chamber is old and still performs its old function and is retained for *that purpose*, and so it is said that the triple-valve chamber also performs a new function, to wit, the function of the separate passageway of the patent, which latter may be, under such circumstances, entirely dispensed with.

III. While it is true, they admit, that the auxiliary-valve must be "independent of the main-valve" of the triple, and although it is true that "triple-valves" having both graduating and main valves, of both slide and poppet forms, were well known in the art, and operated by the piston by its preliminary and final movements respectively; yet they say no man may give *one of those old valves* in such *old* structure an additional function—though he do so by means of his own invention of mechanism of a character not even remotely hinted at in the patent in suit.

IV. The "auxiliary" valve, they say, may be on the reservoir side of the piston and therefore enclosed within and a *part of* the "*triple-valve element* of the "combination"; although it is

obvious that such reconstruction of that element would drop out both the "additional members" described *as essential* in the patent in suit.

V. Notwithstanding that the machine would *not* produce quick action with all four of these changes, nor *unless differential pressures were produced by special means, operating at the proper time, in the valve-chamber*, yet differential pressures (they say in their brief but not in the record), and equivalent means to produce them, exist in the Westinghouse device; notwithstanding that the patent does not contain the most remote intimation of such a thing, and not a word of evidence in the record tending in the slightest degree to dispute with Mr. Boyden the pioneership in *valve-chamber* differential pressures and his means to produce them, and notwithstanding the *prima facies* arising from the grant to him of his patent for *such* means, so operating.

This illogical character of the plaintiff's reasoning in order to find so-called "equivalents" leads only to a *reductio ad absurdum*; and suggests the applicability here, of Judge Clifford's remarks in *Burr vs. Duryee*, (see page 572, 1st Wallace).

"The (defendants) machine has not one of the peculiar
 "devices or combination of devices, of the Wells machine,
 "nor any substantial identity with it, unless by substan-
 "tial identity is meant every machine which produces the
 "same effect. These abstract phrases, 'substantial iden-
 "tity,' 'equivalent,' 'mode of operation' etc., are often
 "used in such a vague and equivocal manner, that they
 "mystify and lead many to absurd conclusions who will
 "not distinguish between things that differ. * * Now
 "an infringement involves substantial identity. * * It
 "is a copy, either without variation, or with such varia-
 "tions as are consistent with its being in substance the
 "same thing. * * No one who * * inspects the two
 "machines can aver that they contain the same combina-
 "tion of mechanical devices, or substantially the same,
 "to produce the desired effect."

"its equivalent, used in the one is to be found in the other, nor is its mode of operation the same. The argument used to show infringement assumes that every combination of devices in a machine which is used to produce the same effect, is necessarily an equivalent for any other combination used for the same purpose. This is a flagrant abuse of the term 'equivalent'."

Morris J., comparing the two devices said:

R., p. 844. "It appears from * * patent 360,070 that what Westinghouse meant by 'auxiliary valve,' which is made one of the elements of the first and fourth claims, is such a valve * * *which is independent of and performs none of the functions of the main-valve.*"

R., p. 844. "I have not been able to satisfy myself that Boyden makes use of an 'auxiliary-valve' in the sense in which that term is employed in the specification and and some of the claims of the patent 360,070 now in suit."

After acquitting Boyden of infringement of claims 1 and 4, the court considers and quotes claim 2—

"Westinghouse discovered that he could accomplish this result by * * * cause the piston of the triple-valve to make an **unusual** and **further** traverse, and thereby actuate a valve which opened a port by which train-pipe-air was admitted," &c. See Record, p. 843, folio 1363.

Note. We have quoted above, to show that Judge Morris believed that "the further traverse of the piston" was absolutely new in this structure. There can be no doubt that he so believed, and there can be no doubt that he was wrong, and there can be no doubt that he construed claim 2 as not impliedly containing the "auxiliary-valve" of the other claims, and as he had already said (R., p. 844), that defendants do not so use an auxiliary-valve.

one of them do quick-action work by an ingenious reconstruction of the triple-valve chamber entirely novel with Boyden; he could not have held them to have infringed claim 2 upon any construction of the claim which *included* the "auxiliary-valve" as an element.

Given the admission that the paragraph in the decision of Judge Morris above quoted is founded on an error in fact, and *that the further traverse of the piston was old*, and that in the triple-valve of patent 220,556 such "further traverse" was used for the sole purpose of opening wide the *main-valve*, to admit *reservoir-air*, and that such further traverse would have no effect to vent train-pipe air in the machine of patent 360,070 in suit *unless an auxiliary-valve, is added*, located at the terminus of the traverse of the piston and controlling a *separate* or by-passage leading "directly" to the brake-cylinder, the learned Judge's construction of claim 2 is shown to be erroneous, even on his own reasoning, and for which *on these very grounds stated* he was properly reversed. He was properly affirmed as to the claims 1 and 4, because he said, and correctly held, that an essential feature of the Westinghouse machine *as described in the specification* was an "auxiliary" valve, "which is independent of and performs none of the functions of the main-valve of the triple" and that *defendants had no such valve*.

VI. The plaintiff's contention, as gathered from the *quoted* passage on page 3 of their *supplemental* brief, rests upon their view that claim 2 is to be broadly construed to cover "any valve device" brought into operation by the further traverse of the piston, that will vent train-pipe-air directly to the brake-cylinder.

It is respectfully submitted that this is equivalent to asking this Court to reinstate the erased original and rejected 1st claim. The word "valve" in the above sentence "any valve device" is mere surplusage, and the latter is equivalent to the sentence "a device" for the simple reason that the function stated in both

claims is the admission of air, and any device whose function is to admit air, must admit it through an opening or port, and any device controlling an air opening or port is, in the technical sense, a valve. The words "further traverse" in the 2nd claim do not distinguish it, in substance, from the original erased 1st claim, (which did not contain these words), for the reason that both claims expressly include as an element a "triple-valve", such as 220 556, which contains *a piston having both a preliminary traverse and a final traverse in its usual operation*, the former opening its graduating-valve and the latter opening its main-valve. It would be both illogical and contrary to the doctrine of interpretation of patents, to hold that a claim which expressly includes a well-known element specifically referred to as 220,556, having a piston with two well-known movements, might for the sole purpose of distinguishing it from some other claim, be construed as including such an element *altered to have only one of such movements, i. e., a preliminary or partial traverse and never a full one.*

But the plaintiffs contend in their brief (though not in the patent) and *must* contend in order to find identity in any respect whatever with the defendant's device, that the (Westinghouse) invention may be stripped of what they call non-essentials, to wit, a *segregated* passageway, and that, while it must have an auxiliary-valve, such valve need not be physically auxiliary, as shown in the patent, but may be integral *and one and the same* with the main-valve of the triple-valve element; the "gist" of the invention, as they allege, being the provision of a valve, whether it be one of the triples or not, that will admit train-pipe-air, provided it be brought into operation by the "further traverse" of the piston. Aside from the proposition advanced by the defendants, which is incontrovertible and has not been answered by the plaintiffs, that even such a broad construction would be useless and inoperative to produce the result, *without a reconstruction of the valve-chamber* (which the Westinghouse patent

does not teach but which the Boyden patent *does* teach for the first time), there are several reasons why the contention of the plaintiffs is unsound.

First. The plaintiff's contention admits that there must be a passageway for train-pipe-air directly to the brake-cylinder. It will not do to say that the triple-valve-chamber may be such a passageway as is contemplated in the plaintiff's patent. If the latter disclosed for the *first time* a triple-valve-chamber and a separate passageway, one for reservoir-air and the other for train-pipe-air, of course it would not necessarily constitute non-indentity to combine the two in one, but where the reservoir-passage existed before, and where it still exists, and is still used for the same purpose that it was used before, the plaintiff's contention is equivalent to dropping out entirely his passageway when he seeks a construction which includes the old passageway to convey *both* airs to the brake-cylinder.

Second. His contention that the further traverse of the piston contacting with and moving a specifically new valve (not an old one already in the device, but with an added function) is "making the piston on its further traverse perform an added new function," is a perfectly correct contention, and that is exactly the invention patented by Westinghouse, in connection with the separate passageway controlled by such valve. But the further traverse of the piston, *not* contacting with, *but carrying at all times* the old *main-valve*, which is *not* an added valve, but is and always was a part of the "triple-valve" element, and still remains in the triple-valve element to perform its old function of admitting reservoir-air on *the same final traverse* of the piston, is not making the piston (in defendants' apparatus) perform a new function in its further traverse, *simply because, by reconstructing the valve-chamber, such old MAIN-VALVE now also performs an additional function.*

Third. The plaintiff's contention, that the defendants' main-valve, is an auxiliary-valve merely because it performs an additional function on the same further traverse of the piston, by

which its main-valve functions always were performed in the old art, is obviously an argument not that defendant's main-valve is the the *mechanical* equivalent of the plaintiff's auxiliary-valve to perform the new purpose, but that it is the *functional* equivalent.

Judge Hughes states the proposition more neatly in the following language, in his opinion (R., p. 881):

"The performance incidentally of quick action service
 "does not make it (the main-valve) an auxiliary valve. It
 "is the same valve. The incidental service is auxiliary
 "but the valve itself is the same and unchanged."

Non-identity, as a Finding of Fact by Three Tribunals.

Three times by three tribunals in succession, (the Patent Office, the Circuit Court, and the Court of Appeals), have the plaintiffs in the case at bar been told that the defendants' novel, admirable and ingenious mechanism, is the "triple-valve" of the prior art improved as described in Boyden's 1892 patents and now operating to vent both such airs by means of novel changes entirely in the *valve-chamber*, and without any changes in, additions to, or subtractions from, its *old valves* or the old *double traverse* of its piston; and that it does *not* contain the "additional members" or any mechanical equivalent therefor, which Westinghouse added to a "triple-valve" having two valves already and a piston having two traverses, to make up his new "combination", as he calls it, in his letter to the Patent Office.

In view of the burden of proof being on the plaintiffs under the single issue of fact involved, and in face of the *prima facie* presumption against the proposition arising from physical differences in the machines, and in the face of a grant of a patent to defendant on the application in which this precise question of fact was passed upon, and in the face of two decisions by the lower Courts, both finding against the plaintiffs' aforesaid proposition,

it is preposterous to say that this Court should, on the mere ipse
fact of counsel in the brief (aided by their pictorial illustrations
of *imaginary* structures in their brief, but not in the record,
and by obvious misnomer of the vital parts of the machine,
and by obviously misleading coloring of such parts) say that
the plaintiffs have discharged their burden of proof beyond any
reasonable doubt, or will upon such showing reverse the find-
ing of fact by three tribunals in succession, all in perfect
accord with each other, on this most vital and decisive ques-
tion of non-identity.

Respectfully submitted,

HECTOR T. FENTON,

Of Counsel for Defendants.

February, 1897.

BRIEF OF RE-ARGUMENT

—BY—

LYSANDER HILL.

ON BEHALF OF THE BOYDEN BRAKE COMPANY,

“Straight” and Automatic Air Brakes.

As the straight and automatic air brakes have been fully described previously, (pp. 3 to 8 in my former brief), I will only discuss the old triple-valve of the automatic air brake, and then show what Mr. Westinghouse and Mr. Boyden respectively invented and combined with the old triple-valve, by which the train-pipe is vented under each car of its air pressure in order to accomplish the result of quickening the serial application of the several brakes throughout the train.

Two Distinct Old Forms of Triple-Valves.

There are two distinct forms of “triple-valves” known to the air-brake art—distinct not in producing different results or having a different mode of operation, but only in their mechanical construction. The one form employs the *sliding* type of main-valve, while the other employs the *poppet* type of main-valve. These two old forms of triple-valves are represented by the cuts opposite ~~the following page.~~

Comparison of the Two Old Forms.

PASSAGES OR CONNECTIONS.

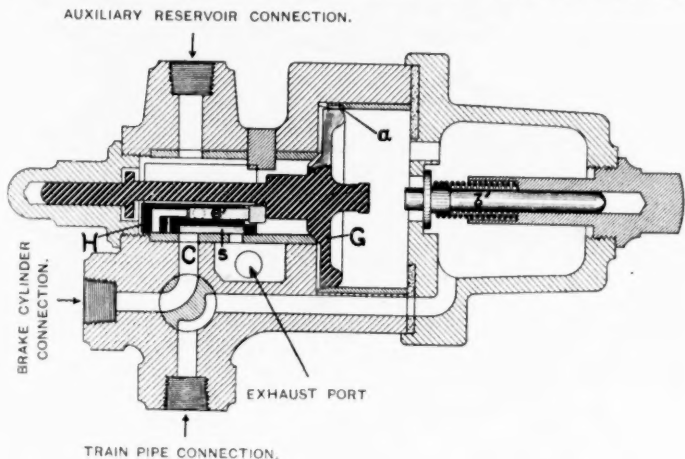
In both forms you will perceive there are passages which connect with the train-pipe; with the auxiliary reservoir; and with the atmosphere.

PISTONS.

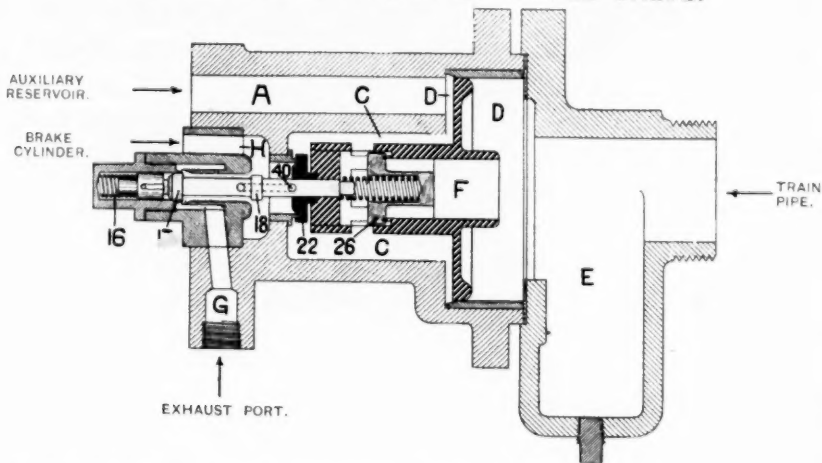
In both forms there is a piston whose function is to actuate the different valves in the triple-valve structure

Cuts of the Two Large Models Used During the Reargument.

THE OLD SLIDE VALVE FORM OF TRIPLE VALVE.



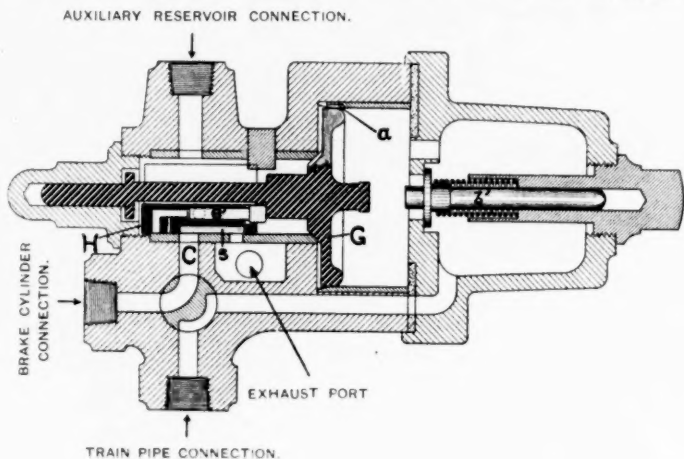
THE OLD POPPET FORM OF TRIPLE VALVE.



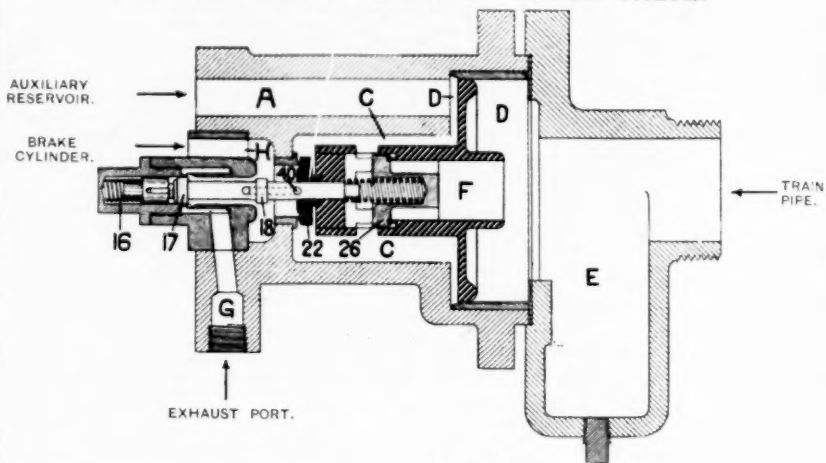
In both structures there are four valves—Feeding-in Valve, blue; Graduating Valve, yellow; Release Valve, green, and Main Valve, black. The valves all functionate as Triple Valves, and it follows that if said valves are "Triple Valves" in the *slide* form, they are also Triple Valves in the *poppet* form. The piston in both has a "preliminary traverse" and a "further traverse."

Cuts of the Two Large Models Used During the Reargument.

THE OLD SLIDE VALVE FORM OF TRIPLE VALVE.



THE OLD POPPET FORM OF TRIPLE VALVE.



In both structures there are four valves—Feeding-in Valve, blue; Graduating Valve, blue; Release Valve, green, and Main Valve, black. The valves all functionate as Triple Valves, and it follows that if said valves are "Triple Valves" in the *slide* form, they are also Triple Valves in the *Poppet* form. The piston in both has a "preliminary traverse" and a further traverse," the two traverses being old, and used since 1873.

FEEDING-IN-VALVE.

In both forms there is a feeding-in-valve (colored blue), whose function is to control a port by which compressed air is admitted from the train-pipe to the auxiliary-reservoir, where it is stored ready for use.

GRADUATING VALVE.

In both forms there is a sensitive graduating-valve (colored yellow), whose function is to control a *small* port through which the air passes slowly or in graduated amounts from the auxiliary-reservoir to the Brake-cylinder, to *slowly or partially* apply the brakes for ordinary service stops.

RELEASE VALVE.

In both forms there is a release-valve (colored green), whose function is to open a port by which air is discharged from the brake-cylinder to the atmosphere, to release the brakes.

MAIN VALVE.

In both forms there is a main-valve (colored black), whose function is to control a *large* port through which the air passes quickly and fully from the auxiliary-reservoir to the brake-cylinder, to quickly and fully apply the brakes for emergency stops.

SUMMARY OF PARTS OF BOTH FORMS OF OLD TRIPLE-VALVE.

First: Each structure has three passages with like connections.

Second: Each structure has a piston.

Third: Each structure has a feeding-in- valve (blue).

Fourth: Each structure has a graduating-valve (yellow).

Fifth: Each structure has a release-valve (green).

Sixth: Each structure has a main-valve (black).

Operation of the Old Triple-Valve.

TO CHARGE THE BRAKES.

In both old structures the air passes from the train-pipe, shifts the triple-valve piston to the left, then passes through a feeding-in-valve (blue) into the valve-chamber and then to the auxiliary-reservoir.

TO SLOWLY AND PARTIALLY APPLY THE BRAKES.

In both structures when a *small* amount of air is discharged by the engineer from the train-pipe, the pistons make their "preliminary-traverse," and thereby open the graduating-valves (yellow), permitting the auxiliary-reservoir air to slowly, or in graduated amounts, pass to the brake-cylinder to slowly or partially apply the brakes.

RELEASE OF THE BRAKES.

In both structures when the maximum pressure is restored by the engineer in the train-pipe, the pistons are moved to their normal position, to the left, thereby opening the release-valves (green) and discharging the air from the brake-cylinder to the atmosphere and releasing the brakes.

TO QUICKLY AND FULLY APPLY THE BRAKES.

In both structures when a *large* portion of air is discharged by the engineer from the train-pipe, the pistons make their "further" or "full traverse," and thereby open the main-valves (black), permitting the auxiliary-reservoir air to *quickly* and *fully* pass to the brake-cylinder and apply the brakes in the shortest time possible and with the maximum pressure.

Therefore the operation of both these old triple-valve structures is the same; they both produce the same results; they both contain pistons which functionate to operate the different valves, and they both contain the same number of valves (four) which functionate precisely the same in their individual capacity, and as a whole. The only difference

between them is in the mechanical construction of their corresponding valves. In one the *main-valve* is of the SLIDE FORM, whereas in the other the *main-valve* is of the POPPET FORM, but in both the main-valve governs the large or main port between the auxiliary-reservoir and brake-cylinder, and is opened by the "further traverse" of the piston. Therefore, I respectfully submit that if the *slide-valve* (black) is the main-valve in one structure, the *poppet-valve* (black) is also the main-valve in the other structure.

These two triple-valve structures are old, all the patents on them have expired, they are public property and any one can make or sell them, or either of them, without being held liable under any patent.

Complainants' and Defendants' Inventions.

COMPLAINANTS' DEVICE.

[See Cuts opposite following page.]

Mr. Westinghouse took the *slide form* of triple-valve, the structure just described, to which he arranged an "auxiliary-valve device" (colored red), shown in the lower cut opposite, and which is made visible in the small models which your Honors have, by turning down the cover concealing the additional device. This "auxiliary-valve device" consists of:

First: By-passages 43 and 46, whose function is to vent the train pipe under each car, whereby the pressure of the train-pipe is quickly reduced and thereby the application of the several brakes throughout the train made nearly simultaneous.

Second: A valve 41, *auxiliary* to this triple-valve. The function of this new valve is to open and close the said by-passage whereby the venting of the train-pipe air is controlled.

Third: In giving to, or endowing, the old "further traverse" of the piston with, a *new or additional function*, to wit, opening the new auxiliary-valve 41.

OPERATION OF COMPLAINANTS' DEVICE.

With this new device added, the old slide-valve form of triple-valve operates as previously described (see upper cut opposite), but when the piston of the triple-valve makes its "further traverse" to perform its old function of *opening* the main-valve (black), to permit the auxiliary-reservoir air to pass to the brake-cylinder (as shown by the red line, see lower cut opposite), said piston now performs the new function—that of *opening* the additional valve 41 (red), which vents the train-pipe air to the brake-cylinder through the additional passage 46 (as shown by the blue line), which has the effect of quickening the application of the brake on the next car, and so on throughout the train, which results in applying all the brakes of the train nearly simultaneous. Thus, in the complainants' structure, *two* valves are employed, and the piston on its *further traverse* required to perform a new or additional function.

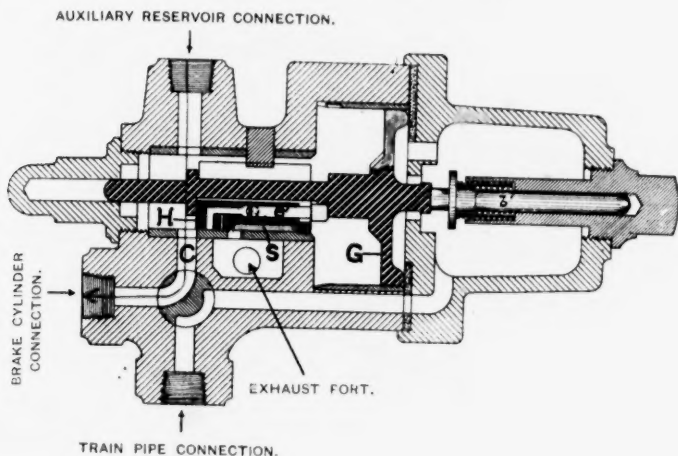
DEFENDANTS' DEVICE.

[See Cuts opposite following page.]

Now, Mr. Boyden took the old *poppet form* of triple-valve just described and perceived, what no man living before him did, that this old triple-valve possessed latent powers that were capable of venting the train-pipe without an additional machine or another valve of any kind, and moreover, that the *further traverse* of the piston need not be called on to perform a *new* function or to do anything more or less than it always had done, and Mr. Boyden's conception was reduced to practice by the most ingenious and simple means imaginable; namely, he merely divided the valve-chamber C from the piston-chamber D by inserting a partition 9.

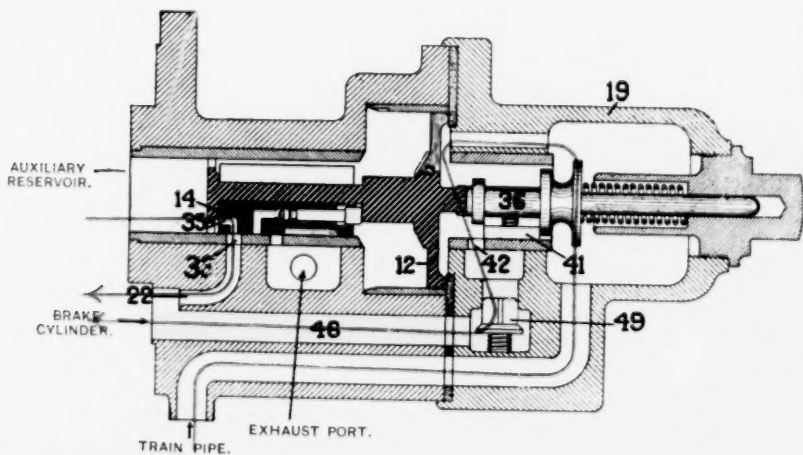
Before this simple change was made the structure was an old plain triple-valve, public property, capable of doing only old triple-valve work. Now, with the *partition* added, it continues to do the same work as before, but it will now also vent the train-pipe. Your Honors will perceive that no passage has been

THE OLD SLIDE FORM OF TRIPLE VALVE, Incapable of Quick Action.



Complainants Structure.

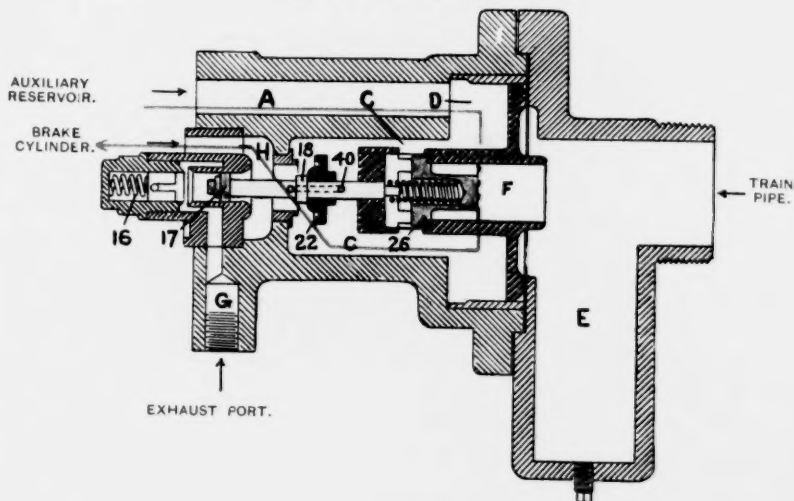
The Old Slide Form of Triple Valve plus the Complainants Second Machine, consisting of an Auxiliary Valve 41, and By-passage 46, shown in Red.



It is therefore seen that the Complainants take the slide form of Triple Valve and combine with it a second machine through which the train-pipe air is vented, and endow the piston with a new function, that of operating the second machine.

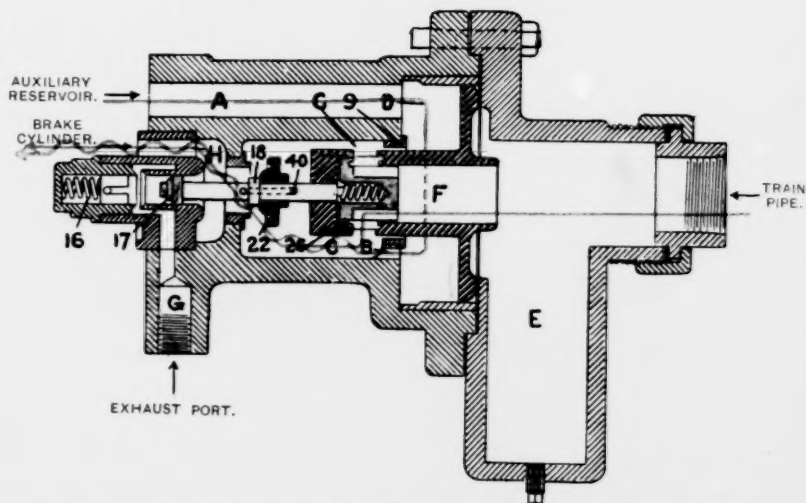
THE OLD POPPET FORM OF TRIPLE VALVE

Incapable of Quick Action.



Defendants Structure.

The Old Poppet Form of Triple Valve, made Capable of Quick Action by inserting Boyden's Partition 9.



It is therefore seen that Defendants take the old Poppet form of Triple Valve and make it vent the train-pipe air by simply inserting the Partition 9 without requiring a second machine of any kind, or requiring the piston to perform a new function.

added for train-pipe air to pass through; no new valves have been *added* nor does the *piston* perform any new function. The only change made is the insertion of the partition 9.

OPERATION OF DEFENDANTS' DEVICE.

Your Honors will recall that, as a plain triple-valve, when the brakes were to be *quickly* and *fully* applied, the piston of this same structure made its "further traverse," and fully opened the main-valve port for the auxiliary-reservoir air to pass to the brake-cylinder (as shown by the red line, (see upper cut opposite). Now, when the partition 9 is in place, that old operation of the piston and the main-valve is performed just as before, but the partition serves to partially confine the auxiliary-reservoir air in the piston-chamber D and thereby prevents that air from freely passing to the valve-chamber C, so that the previously existing 70 lbs. pressure in the valve-chamber is instantly discharged through the wide-open port of the main-valve and said pressure is thereby reduced to about 5 lbs., whereupon the air-pressure from the train-pipe, at 55 lbs., enters the chamber C (shown by the blue line, see lower cut opposite), and commingling with the auxiliary-reservoir air (shown by a red line), is vented through the *main-valve port*, which results in the quickening of the brakes on the following car. Thus in the defendant's device only *one* valve is used to vent the two airs, and that the old main-valve (black) of the triple-valve, and the piston is *not* required to perform a *new function*.

It is therefore seen that in defendants' structure the only alteration in the old triple-valve is the *insertion of the partition 9* which enables the old triple-valve to vent the train-pipe air.

Defendants' structure therefore does not employ :

First : Any by-passage.

Second : Any auxiliary-valve.

Third : Nor require the "further traverse" of the piston to perform any *new* or *additional* function.

All three of these are the very essence of, and are absolutely required in the complainants' structure. As not one of them is to be found in defendants' structure, evidently, that structure is not the same as complainants.

Comparison of Complainants' and Defendants' Devices.

In the Westinghouse device the old element (triple-valve) is provided with a new and an additional valve device that *functionates* to vent the train-pipe air. The new device is actuated by the "further traverse" of the old piston. Thus, as stated in Claim 2, the piston "*by a further traverse, admits air directly from the main air-pipe to the brake-cylinder.*"

In the Boyden structure no new device is added to the old triple valve element to vent the train-pipe, or to be actuated by the "further traverse" of the old piston. The device Boyden added *functionates* to suddenly reduce the pressure in the valve-chamber, and the train-pipe air then enters said chamber and flows out through the *main-valve* port, which is, and always is, wide open when making an emergency stop with *any* form of triple-valve. In Boyden's device it is true the train-pipe air is admitted to the brake-cylinder *at the moment* the "further traverse" of the piston is made, but this result is produced *not* "by the piston" as in complainants', but by the partition 9.

In other words Mr. Westinghouse's *new device* (the auxiliary-valve 41) *functionates* to do the *new thing* by a preceding action of the old element (the piston), whereas Boyden's *new device* (the partition) *functionates* to enable the *old element* to do the *new thing*.

Certainly here is a radical difference between two inventions to accomplish the same result. The Court of appeals in comparing them remarked, "they seem to us to differ as widely from each other as two devices for accomplishing the same

result can well differ," and this conclusion of that Court is true for the following reasons:

- (a) Westinghouse's added device (the auxilliary-valve) functionates to vent the train-pipe.

Boyden's added device (the partition 9) functionates only to restrict the flow of auxiliary-reservoir air.

- (b) Westinghouse's added device (the auxiliary-valve), is operated by the "further traverse" of the piston.

Boyden's added device (the partition 9), is not operated by the further traverse of the piston, or otherwise, for it remains stationary.

- (c) Westinghouse endows the triple-valve piston with a new function, to wit: opening the new auxiliary-valve to admit train-pipe air.

Boyden does *not* endow the triple-valve piston with any new functions, or call on it to do any thing more than it always did,—it simply opens the same old valves.

With these great existing differences, we submit it is not possible for the device of the defendants to come within any claim the complainant's patent may have.

Comparison of the Two Devices with Claim 1, 2 and 4, Alleged to be Infringed.

Claim 1 is as follows:

"In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder, a triple valve, and an *auxiliary-valve* device, actuated by the piston of the triple-valve and independent of the main-valve thereof, for admitting air in the application of the brake directly from the main air-pipe to the brake-cylinder, substantially as set forth."

Now, all the elements named in this claim are old in automatic air-brakes except the "*auxiliary-valve*." In the defendant's device no "auxiliary-valve" is employed, as the old main-valve, black, is used to vent the train-pipe are at the same time

it is performing its old function of venting the auxiliary-reservoir air. Therefore there is no infringement of claim 1, as the only new element in that claim is not found in defendant's device.

Claim 4 is as follows:

"The combination, in a triple-valve device, of a case or chest a piston fixed upon a stem and working in a chamber therein, a valve moving with the piston-stem and governing ports and passages in the case leading to connections with an auxiliary-reservoir and a brake-cylinder and to the atmosphere, respectively, and an *auxiliary-valve* actuated by the piston-stem and controlling communication between passages leading to connections with a main air-pipe and with the brake-cylinder, respectively, substantially as set forth."

This claim is substantially like claim 1, all its elements being old except the "*auxiliary-valve*," and defendant's device not having an auxiliary-valve, is no infringement of that combination for the same reason that applies to claim 1. The Circuit Court and the Court of Appeals for the Fourth Circuit both held that neither claims 1 nor 4 are infringed by the Boyden device.

Claim 2 is as follows:

"In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder, and a triple-valve having a piston whose preliminary traverse admits air from the auxiliary-reservoir to the brake-cylinder, and which, by a further traverse, admits air directly from the main air-pipe to the brake-cylinder, substantially as set forth."

Owing to the ambiguity of the language used in this claim it is subject to several different constructions.

AMBIGUITY OF CLAIM 2.

The ambiguity arises from the fact that the combination named in the claim was old. It is simply the old triple-valve device of patent 220,556 and other old triple-valve patents. The two traverses were also old, and it was old to apply the partial traverse for graduating and service stops, and the full traverse for emergency stops.

The only new thing referred to in the claim is indicated by the words: "A piston * * * which, by a further traverse *admits air directly from the main air-pipe to the brake-cylinder.*" The "piston" is the mechanical element here named as the actor; and the words "admits air directly from the main air-pipe to the brake-cylinder," specify merely the function or act performed by the piston. But a *function* is not patentable; and hence the claim must rest squarely on the *piston*, which is said to perform the function.

The piston, itself, however, is old, being nothing more nor less than the piston shown in Fig. 4 of patent 220,556 (R., p. 762); hence, a claim based on the *piston* as the alleged element of novelty cannot stand. The entire combination named in the claim, including the piston, is old; and in the old structures the piston had the same movements that it has here, and under precisely the same conditions. This old combination cannot lawfully be claimed here; and yet, if we read the claim literally, it is the only mechanical thing that *is* claimed here. How, then, shall the claim be construed?

In considering this question, the first thing which arrests our attention is the fact that the combination named in the claim, including the piston, *does not perform the function alleged of it*, and cannot perform it without the aid of other important instrumentalities not mentioned in this claim, viz., the auxiliary-valve 41 and by-passage 42, 43, 46. It did not perform said function, in patent 220,556, because of the absence of these additional instrumentalities; and it does perform it in patent

360,070 because of their presence. They are, therefore, absolutely vital to any proper legal construction of the claim, and must, in some form or other, be construed into the claim; otherwise, the claim is invalid, for the same reason that Morse's eighth claim (*O'Reilly vs. Morse*) was held invalid.

CONSTRUCTION OF CLAIM 2.

We can conceive of only two ways in which the *necessary additional elements* can be construed into the claim, viz., (1) by construing it so broadly as to cover *all possible additional means* which will enable the specified combination to produce the specified result; and (2) by construing it to cover, as implied elements of the combination, *the auxiliary-value 41 and its by-passage*.

Can there be any doubt as to which of these two constructions should be adopted? We think not. The former would bring the claim directly within the inhibition of this Court in *O'Reilly vs. Morse*, 15 How., 62; *Burr vs. Duryee*, 1 Wall., 570, and *The Incandescent Lamp Case*, 161 U. S., as well as under that of the leading English case on this subject, *Neilson vs. Harford*, 1 Webster's Pat. Case, (cited and commented on at length in *O'Reilly vs. Morse*), as being for a "principle," or, in other words, for all possible ways of accomplishing the result, whether they were known to Mr. Westinghouse, or included within the means invented by him, or not. Such a construction would make this Court say, in substance: "The combination that is named in the claim does not do the work; something must be added to it to enable it to accomplish the function; and we will, therefore, construe the claim as covering everything that *can* be added to it for that purpose, whether like the means which Mr. Westinghouse invented or not, and whether now known, or discoverable only by future effort." This Court will never give such a construction to the patent law; for it would overthrow every decision on the subject made in this country or England during the last fifty years. If Sawyer & Man, who

broadly claimed "carbonized *vegetable* fibre" for incandescent lamp filaments (*The Incandescent Lamp Case*, 161 U. S.), were not allowed to cover carbonized *bamboo* fibre, because they had no knowledge of its superior qualities when they procured their patent, how can Mr. Westinghouse be allowed to cover, by the indefinite language of his second claim, devices which he did not invent, and of whose structure and mode of operation he was totally ignorant? The doctrine of *The Incandescent Lamp case* is, that a patentee can cover only what he has invented or discovered, and that if his claims, by the use of broad generalizations, reach out beyond his real discovery, they must be limited back to it by construction. What Mr. Westinghouse invented and added to the old triple-valve, and described in his patent as new, was the auxiliary-valve 41 and its by-passage; and if his second claim reaches beyond this, it should be limited back to it, as was done in *The Incandescent Lamp Case*. This fully protects his rights, and leaves other inventors to benefit the public by discovering other and different means for accomplishing the result.

We are, therefore, constrained to adopt the *second* of the two constructions, which can be given his claim 2, viz., to read the claim as embracing the auxiliary-valve 41. This corresponds to the description contained in the specification, and gives effect to the words "substantially as set forth," found at the end of the claim. It is consistent with the statement of the specification, that the triple-valve

*"is not, therefore, saving as to the structural features
 "by which it performs the further function of effecting
 "the direct admission of air from the main air-pipe to
 "the brake-cylinder, as presently to be described, claimed
 "as of my present invention."* (R., p. 784 L. 12.)

The Patent Office Record Shows that Mr. Westinghouse Himself Placed this Construction on Claim 2.

Mr. Westinghouse's attorney, in his letter, when arguing for the allowance of this second claim, said that the "applicant does not seek to broadly claim a device for admitting air directly from the main air-pipe to the brake-cylinder," but that "when, however, the triple-valve *is provided with an auxiliary-valve, operated by its piston*, which performs a new function, additional to that of the triple-valve as previously employed, it is believed that *such combination is wholly novel*." (R. p. 718, L. 41.) It is consistent with the admission of complainants counsel, p. 41 of their brief, used in the Circuit Court of Appeals, at Richmond, where they said that the "quick-action attachment, consisting of an air-conduit or passage-way, directly from the train-pipe connection to the brake cylinder, *and a valve to control it,*
 * * * *is so made the subject matter of every claim in controversy as to give character and effect thereto*, and render the scope of the claim coextensive with the invention." It agrees with the decision of Judge LACOMBE, in the New York case, who construed the second claim as like the first, but more limited—meaning that the first claim covered the auxiliary-valve, whereas, the second claim covered it only when used on the *final traverse* of the piston—but reading the auxiliary-valve into all of the claims.

So construed, the claim is not infringed by the Boyden device, which has no auxiliary-valve or by-passage, but, on the contrary, has a entirely novel mode of operation, whereby the work is performed by the old plain triple-valve without the aid of anything added by Westinghouse.

THE COMPLAINANTS' CONSTRUCTION OF CLAIM 2.

Complainants' counsel, on p. 22 of their brief at the former hearing in this court, suggested that Westinghouse "availed himself of the capacity of the triple-valve piston for varying

lengths of travel," "to perform a new function," viz., by its final traverse to *open a passage directly from the train-pipe, and thereby charge train-pipe air directly into the brake-cylinder*; and they seem to think that if the second claim be construed as covering the performance by the piston of this "new function," the defendants will necessarily infringe the claim. But in this they are in error, as we will now proceed to demonstrate.

In their assumption that the *Westinghouse piston* performs a new function, they are correct. Prior to the invention of the patent in suit, that piston, in making an emergency-stop by the old triple-valves, performed one function, namely, that of opening the *main-valve* to admit *auxiliary-reservoir air* to the brake-cylinder. In the device of the patent in suit he retained that old function and added the new one of opening also the *auxiliary-valve* to admit *train-pipe air* to the brake-cylinder, thus it now performs two functions.

But, in making an emergency-stop with the Boyden device, the piston performs only *one* function, to wit: its old and well-known function of opening the *main-valve* to admit auxiliary-reservoir air to the brake-cylinder, common to all the old triple-valves. Having performed that function, the piston ceases to act. Now, *that* function does not admit train-pipe air to the brake-cylinder—if it did, the old triple-valves would be quick-action triples, and there would have been no occasion for the new invention of Mr. Westinghouse—and if it did, the Boyden device *with the partition 9 removed* would be a quick-action triple, which it admittedly is not. It is clear, therefore, that opening the main-valve is not the *cause* of admitting train-pipe air. The opening of the main valve merely creates a passageway from the valve-chamber to the brake-cylinder—the *old passageway*, always created in the same way by the main-valve of the old triple-valves when making an emergency stop. When this passageway is thus created, the train-pipe air will not enter the valve-chamber and flow to the brake-cylinder, *unless*

the pressure in the valve-chamber can be, in some way, reduced far below that of the train-pipe. Now, what causes the pressure in the Boyden valve-chamber to be reduced below the train-pipe pressure, when making an emergency stop? Not the opening of the main-valve, because, when the partition 9 is removed and the main-valve opens to its full extent, in making an emergency stop, the pressure in the valve-chamber *does not* reduce below that of the train-pipe. What, then, is it that reduces the pressure of the valve-chamber to a greater extent than the train-pipe pressure? We answer: Mr. Boyden had the genius to perceive that when the main-valve was open to admit auxiliary-reservoir air to the brake-cylinder, as in all the old triple-valves when making an emergency stop, *if he could choke off the auxiliary-reservoir air from entering the valve-chamber so fast as it discharges therefrom to the brake-cylinder*, he would thereby obtain such a reduction of pressure in the valve-chamber as would enable the train-pipe air to open the check-valve 26 and flow to the brake-cylinder together with the auxiliary-reservoir air; and he inserted the partition 9 to *choke off the auxiliary-reservoir air, and thereby accomplished quick action* by the venting of train-pipe pressure on each car. In this act the main-valve simply performs its old function of opening the passageway; while the partition 9 performs a new function—that of choking off the auxiliary-reservoir pressure from the valve-chamber. When this new function of the partition is superadded to the old one, then quick action takes place; and only then. The new function performed by the piston in the device of Mr. Westinghouse is not a choking-off function, and is not performed upon the auxiliary-reservoir air flowing *into* the valve-chamber; on the contrary, it is a valve-opening function, and is performed upon a sliding piece of metal arranged in the side wall of the drain-cup. The two new functions of Westinghouse and Boyden are, therefore, absolutely different from each

other—nothing could be more so; they are performed upon different materials, and they are performed by different agencies—the one, by the final traverse of the piston acting on the new auxiliary-valve; the other, by the motionless presence ~~of~~ of the obstructive partition having *nothing to do with the piston*, and acting only on the air-pressure in the valve-chamber.

It follows, as before stated, that if we adopt the legal construction of the claim, as suggested in the brief of complainant's counsel, to wit: That it covers all triple-valve devices in which the piston performs the *new function* of the Westinghouse piston, still the defendants' device would not infringe the claim, because (1) its piston performs no *new function*; (2) only the partition 9 performs anything like a new function in the Boyden device; and (3) that function is totally different from the new function of Westinghouse piston, and produces the result by a totally different mode of operation. **Given an old triple-valve, Westinghouse adds a new air-passage, and a new valve to control it and endows the movement of the piston with a new function; given an old triple-valve, Boyden adds a new stationary partition to reduce the pressure in the valve-chamber, but does not endow the movement of the piston with a new function.** How could two inventions be more totally different from each other than these two? And, how can any valid claim be drawn on the one that will cover the other? The vice in the theory of complainants' counsel, relative to claim 2, lies in its ignoring the fact that Westinghouse's piston, in making its "further traverse," performs *two* functions (the old and the new), while Boyden's piston performs only *one* (the old); and that Boyden has discovered how to take advantage of this performance of the piston's *old* function by choking off the access of auxiliary-reservoir pressure to the valve-chamber, and *thus* causing the train-pipe air to enter that chamber and pass to the brake-cylinder. The question is not whether they both effect quick action, for that is only the general result, and not patentable to either; but it is, *how* they

effect it; and, as we have seen, they do the work by entirely different devices and different methods.

Therefore, even if the Court construes the ambiguous language of claim 2 to mean just what the complainants contend for, namely, the "further traverse" of the piston performing a *new function*, by which the train-pipe air is admitted to the brake-cylinder, the defendants' device cannot be an infringement of that claim, as in it the piston *does not* perform a *new function*. But this construction of complainants is not permissible in view of the rejection of claim 2, and its subsequent allowance, as stated in applicant's letter to the Patent Office (R., p. 718, L. 41), that when an "auxiliary valve" is used with the old triple-valve piston, *that* is a novel "combination."

Claim 2 Construed as Including the Double Traverse of the Piston, a Passage-Way and a Valve.

Claim 2 construed as set forth on p. 89 of complainants brief for "(1) the double traverse of the piston, (2) a passage, or way of access directly from the train-pipe to the brake-cylinder and (3) a valve which controls the passage."

This statement of complainants counsel as to what constitutes the "*essentials*" of the Westinghouse structure, we agree is correct as far as it goes, but we add that any statement of "*essentials*" must be *consistent* with the specification. On this important point (*essentials*) the specification is clear and explicit and shows that what complainants' counsel call the "*essential features*" to wit, the passage for train-pipe air and the valve, are expressly stated to be "additional members" to the triple-valve. The specification of the patent says: (Rec. p. 785 last line.)

"the triple-valve accords * * * with my letters-patent * * * 220,556, and in "order that it may perform the further functions requisite in the practice of

"my present invention, it is provided with certain *additional members*, which will now be described. For the purpose of effecting the admission of air directly from the main air-pipe to the brake-cylinder when it is desired to apply the brakes with great rapidity and full force, an auxiliary slide-valve 41 (the red valve) is connected" etc., and a separate passage 46 to the brake cylinder is provided. It is therefore submitted that the "essentials" must consist of "additional members" *added* to the *old* triple-valve.

We do not contend that claim 2 should be limited as complainants say "by a *slavish* adoption of the *identical* instrumentalities" described in the specification, on the contrary we say construe the claim as broadly as possibly consistent with the specification of the patent, to wit: a valve and passage-way of any form or character which are "additional members" to the *old* triple-valve. These are what Mr. Westinghouse describes as his new devices and claim 2 so construed will be co-extensive with his invention.

Defendants device does not infringe claim 2 thus construed because the valve and passage employed are *old* triple-valve parts, and in no sense "additional members" of the triple-valve, and therefore not within the claim 2 under this construction.

Complainants' Contentions Answered.

COMPLAINANTS' CONTENTION AS TO DEFENDANTS' MAIN-VALVE 22
BEING THEIR AUXILIARY VALVE.

The complainants realizing that they are compelled to find an auxiliary-valve in the defendants' devices try to do so by specious arguments and theories, contending that the defendants' OLD POPPET FORM of main-valve is the new AUXILIARY-VALVE of the patent in suit. But this Old Poppet Valve (Black) was in triple-valves as early as in 1873. (See Patent No. 141,685, R-, p. 736). Its function therein was to admit the auxiliary-reservoir air to the brake-cylinder, a function

which it still performs in the defendants' device; but now, because the same valve admits the train-pipe air while it is admitting auxiliary-reservoir air, they say it becomes a new and auxiliary-valve. The Court below, in defining this valve, stated:

"In the original triple-valve it performed no other service than admitting auxiliary-reservoir air into the brake-cylinder; in Boyden's device it continues to perform that service, and is made incidentally instrumental in allowing the passage of train-pipe air. The performance incidentally of quick-action service does not make it an auxiliary-valve. It is the same valve. The incidental service is auxiliary, but the valve itself is the same and unchanged." (R., p. 881.)

And that statement of fact is obviously absolutely true.

WHY IT IS THE MAIN-VALVE.

In all triple-valves used since 1873 to the present time the main-valve thereof is located on the auxiliary-reservoir-side of the piston, so that when closed, it prevents auxiliary-reservoir air from passing to the brake-cylinder, and when opened admits the auxiliary-reservoir air to the brake-cylinder. Now, this is just where the defendants' POPPET-VALVE 22 (black) is located, and is just what it does when closed and what it does when opened. It was the MAIN-VALVE before the partition 9 was put in the device, and the insertion of the partition cannot make the MAIN-VALVE that existed before in the structure an auxiliary or additional valve, and this fact has been three times so decided.—First, by the Patent Office (R., p. 815, L. 23); second, by Judge Morris, of the Circuit Court (R., p. 845, L. 2); and, third, unanimously by the Circuit Court of Appeals for the Fourth Circuit (R., p. 881, L. 40).

COMPLAINANTS CONTEND THAT THE DEFENDANTS' PARTITION 9 IS FOUND IN THEIR STRUCTURE AND IS OLD.

This contention is absolutely untrue, as the complainants' structure does not contain a partition to divide the valve chamber C from the piston chamber D. If the complainants' device

has such a partition, why the necessity of the "additional members," consisting of a by-passage and auxiliary-valve? And why is it that the piston therein has to do more work, by performing an additional function, than it did before? No; Boyden's partition is not found in complainants' device.

The complainants are trying to deceive the Court by a specious argument that the port 35 and the end of the main-valve 14 is the equivalent of Boyden's partitions; but are those things of complainants *located* between the piston-chamber D and valve-chamber C? No. Or, do those things make the triple-valve *per se* vent the train-pipe in the complainants' device? No. The fact is, that counsel for complainants realize the controlling character of defendants' *partition* 9, and are simply trying, by specious arguments, to make the Court believe that it is not new with Boyden, and that it is found in complainants' structure.

BOYDEN'S PARTITION NEW.

As to its being, new, no one can point to a triple-valve in the whole prior art that contains *such* a partition, one that will confine the air in the piston-chamber D and cause the air-pressure to be *lowered* in the valve-chamber C, so that the triple-valve will vent the train-pipe air by such an operation. This partition 9 was absolutely new with Boyden. It was *broadly* patented to him on his application, dated September 30, 1889, (R., p. 799, L. 5,) *before December 12, 1889, when this suit was brought*; therefore, their allegation on page 5 of their brief is untrue.

ALL TRIPLE-VALVES HAVE SOME KIND OF PARTITION.

It is true all triple-valves have partitions; the piston is a partition, all the valves are partitions, the dividing walls are partitions, but no partition operating like Boyden's is found in any prior triple-valve or in any structure that complainants have; a partition that will endow the triple-valve with capabilities to vent the train-pipe *without adding any valves* or changing its old function, and not requiring its piston to perform a

new function or to do one thing more or less than it always did. That kind of *partition* is nowhere found in the whole art except in the Boyden invention.

CREDIT DUE MR. BOYDEN.

To Mr. Boyden is due the credit that the art is advanced one more step by the invention of a partition inserted in the triple-valve chamber by which additional valves and passages are dispensed with and the prior quick-action structure is simplified one-half, whereby fewer parts are required to be kept in order, fewer parts to be replaced, and a greater certainty of action when the apparatus is called on to prevent the loss of life and the destruction of property.

THE CAPABILITY OF BOYDEN'S PARTITION.

That partition is a very simple and small thing, but its capabilities are great; by it the latent powers of the triple-valve are made available; by it the old emergency application of the triple-valve is changed; by it the *additional* member of the patent in suit or of a "second machine" of any character are entirely dispensed with and the piston not required to do additional work.

In the Boyden structure the feeding-in-passage from the train-pipe through the piston to the valve-chamber, and thence to the auxiliary-reservoir, is to be regarded as always open inward towards the valve-chamber, but checked by the check-valve 26 against backward flow into the train-pipe. The Boyden piston, with its check-valve, is borrowed bodily from the old Boyden patent of June 26, 1883, No. 280,285, where it will be found illustrated in Fig. 3 of the patent drawings. (R., pp. 448 and 776). An inventor naturally prefers his own creations, and Boyden preferred his own old form of piston, with its central check-valved feed-passage, and its tubular inward extension or stem. In Boyden's patent of June 26, 1883, four years before the patent in suit, he applied to this check-valved central

feed-passage the term "an always-open, one-way passage;" and it is a construction which Mr. Westinghouse expressly disclaims in the disclaimer which appears in the specification immediately before the claims of the patent in suit. (R., p. 788.)

Now, if the check-valve of this passage be omitted from the Boyden device here in suit, the passage will be absolutely open between the train-pipe and the triple-valve chamber at all times, and in both directions; *but the device will still perform quick-action on the emergency-stop, just as before*, the office of the check-valve being merely to prevent air from passing backward into the train-pipe, and not to prevent it from passing forward from the train-pipe to the valve-chamber. Without the check-valve 26, the device will not operate to graduate, or for service stops, because the auxiliary-reservoir air will escape backwards into the train-pipe. But in making an emergency-stop, the auxiliary-reservoir air has no time to flow back into the train-pipe before the piston is drawn back through its full traverse; and, as the partition chokes off the flow of auxiliary-reservoir air to the valve-chamber, the reduction of pressure thereby affected in the latter chamber allows the train-pipe air to press forward into said chamber, just the same without as with the presence of the check-valve. We mention this fact to show that it is the partition 9 to which the whole credit of quick-action in the Boyden device is due. True, the partition alone will not produce quick-action; *but when added to an old triple-valve capable of performing its old and usual functions, the partition 9 will superadd the function of retaining the train-pipe air for quick-action.*

COMPLAINANTS CONTEND THAT THE BOYDEN DIFFERENTIAL PRESSURES ARE FOUND IN THEIR STRUCTURE.

This is absolutely untrue; of course all tripe-valves, in operating, must have differential pressure, but none have those differential pressures which are produced in the operation of the Boyden structure. Namely: First, retaining 70 lbs. pressure in

the piston-chamber D; second, *reducing* the prior 70 lbs. in the valve-chamber C to 5 lbs. pressure at the instant that the pressure in the train-pipe is at 55 lbs. and thereby uniting the train-pipe and auxiliary-reservoir pressures in the triple-valve chamber and simultaneously venting them together through the port opened by the old main-valve of the triple-valve. (See card 6, with model of defendant's structure.) *This* kind of differential pressure never existed in any triple-valve prior to Boyden's invention, nor does it exist in the complainants' structure. Nowhere have complainants pointed out in their structure that the maximum pressure of 70 lbs. in the main-valve chamber is *reduced* from 70 lbs. to 5 lbs., and thereby *make the main-valve of the old triple valve vent the train-pipe pressure* at the instant it vents the auxiliary-reservoir pressure. These are the Boyden differential pressures: and they are not found in the operation of the complainants' structure.

COLORING THE SEVERAL VALVES DIFFERENTLY.

When this case was first presented in the Circuit Court the defendants adopted the method of coloring the corresponding valves in the defendants' and complainants' structures the same color, and applying a different color for each kind of valve; they also used this method before the Circuit Court of Appeals, the object being to assist the Court in quickly distinguishing the different valves without great labor on their part of tracing the different and numerous lines that form the boundary line of the valves. The complainants did not adopt this system in the lower Courts, but finding that it clearly enlightened the Courts as to just what the different valves were, they have for the first time adopted it before this Court. Now they have a perfect right to do so, but *they use the colors to complicate* and confuse the two structures by omitting and not coloring the corresponding valves alike. For instance, in the cuts of their device opposite page 22 of their brief, they properly color the valves. That is to say, the *release-valve* (green), the sensitive

graduating-valve (yellow); the main-valve (black) and the auxiliary-valve (red) which vents the train-pipe air, but they failed to color the feeding-in valve, blue (see same colored, opposite page 18 of my original brief).

But when they color the valves in the defendants' device, opposite pages 39, 40 and 78, they do not color the feeding-in valve (blue) nor the sensitive graduating-valve (yellow). Now, why did they not frankly put the proper color on all the valves in both structures? The reason is, that if they colored the sensitive graduating-valve 18 in the defendants' structure, yellow, they would have to color the main-valve, 22, black, and therefore there would be no valve left to be colored red, that would correspond to their new auxiliary-valve 41; a procedure that is specious and misleading, and intended to befog rather than elucidate the subject under controversy.

THE COMPLAINANTS' METHOD OF COLORING PROVED TO BE
ERRONEOUS.

Their erroneous method of coloring the valves is conclusively proved by numerically comparing the valves in both structures.

COMPLAINANTS' STRUCTURE.	DEFENDANTS' STRUCTURE.
First: Feeding-in valve (blue).	First: Feeding-in valve (blue).
Second: Release valve (green).	Second: Release valve (green).
Third: Graduating valve (yellow).	Third: Graduating valve (yellow).
Fourth: Main valve (black).	Fourth: Main valve (black).
Fifth: Auxiliary-valve (red).	(No fifth valve).
Making five in all; four belong to the old triple-valve and one belongs to the <i>new</i> machine.	Making four in all, and all of which belong to the old triple-valve.

Therefore it is obvious that complainants' red color on the main-valve in the defendants' structure, to show that it is an

auxiliary-valve, has no justification, and is absolutely misleading and erroneous.

THE NUMEROUS IMAGINARY VALVES ALLEGED TO SHOW MODIFICATIONS OF COMPLAINANTS' STRUCTURE.

The complainants have inserted cuts of numerous imaginary valves in their brief for the purpose of trying to break the force of defendants' coloring. Now these imaginary valves are not in the record. There is no testimony pertaining to them nor have the defendants had an opportunity to rebut the statements pertaining thereto, and therefore they should be considered with great caution if considered at all by the Court.

It is a conspicuous fact about these numerous valves which purport to show that the complainants' and defendants' structures are substantially the same, that in those shown opposite p. 62, of plaintiffs' main brief, which are minus the Boyden Partition 9 dividing the valve-chamber from the piston-chamber, *two* valves and a by-passage are required to vent the two airs; i. e., a red valve to vent the train-pipe air and a black valve to vent the auxiliary-reservoir air; and those opposite p. 64, that show one valve venting the two airs without any by-passage *have* the Boyden Partition 9. Therefore these very imaginary valves prove that by the use of the Partition 9 *one* valve is made to perform the two functions, and where the partition is not shown, *two* valves are required, and this is just where the difference is between the two inventions. In other words, Westinghouse uses the old main-valve (black), of the triple-valve to vent the auxiliary-reservoir air, and a *new* valve (red), to vent the train-pipe air; whereas Boyden uses only the old main-valve of the triple-valve to vent *both* the auxiliary-reservoir air and train-pipe air. (See card 6, small models of defendants' device.)

Designate, color, or arrange these as you may, when you find one valve venting the two airs, *that* is Boyden's invention, and where you find two valves venting the two airs that



FOLDOUTS TOO LARGE TO
BE FILMED

is Westinghouse's invention. This rule is infallible and distinctly defines the difference between the two inventions, and should they be put into a hundred different imaginary forms the two inventions can be immediately distinguished by the application of this rule.

It is submitted that it is opposed to common sense to multiply indefinitely the structures by inserting cuts of imaginary forms that only tend to confuse instead of shedding light on the subject, and that, too, by imaginary forms that have not been *testified to*.

Patent 360,070 Not a Pioneer or Meritorious Invention.

The complainants in order to get a broad and general construction of the patent in suit, and to impress the Court with its alleged merit and magnitude, have endeavored to establish a "pioneership" for it that is wholly specious and not consistent with the facts of history pertaining thereto.

To construe the claims of the patent in suit as liberally and broadly as the circumstances and language of the claims will permit, is proper, and is but justice to the complainants; but in view of the failure of this device to solve the problem of quick-action air-brake, to give the patent undue credit as a meritorious invention, and then use that credit as a reason for expanding the claims, would be a wrong to both defendants and to the public.

EXHIBIT OF 1879, 1887 AND 1888 PATENTS.

The illustrations on folded insert show just where the patent in suit stands as to pioneership and just how meritorious it is.

PATENT OF 1879—DISCLOSING THE FUNDAMENTAL LAW OF QUICK-ACTION.

The drawing to the left represents the device which disclosed the fundamental law of consecutive quick-action, and that law is applied in every quick-action brake of to-day. It was patented

in 1879, in the United States, by Mr. Westinghouse. It consists, first, of a train-pipe; second, an auxiliary-reservoir; third, a brake-cylinder; fourth, triple-valve, all of which are old and constitute the plain automatic brake, and in order to quicken the serial application of the several brakes in a train, it has combined with it an *auxiliary-valve*, colored red, to vent the train-pipe, and a supplemental-piston, colored brown, to actuate the auxiliary-valve. Now, in its operation when a quick-action is to be made, sufficient air is discharged by the engineer from the train-pipe to move the piston of the triple-valve its full stroke and open the main-valve (black) to fully apply the first brake with auxiliary-reservoir air, the course of the air being shown by a red line, and at the same time this discharge of air by the engineer moves the supplemental piston (brown), which opens the auxiliary-valve (red) at each car and vents the train-pipe air, its course being shown by a blue line, resulting in effecting the quick application of the brake on the following car, and so on throughout the train, producing a nearly simultaneous application of the several brakes. (R., p. 759, L. 42.)

THE UNSUCCESSFUL DEVICE OF THE PATENT IN SUIT OF 1887.

Now, in 1886 or 1887, Mr. Westinghouse took this fundamental law of 1879 and applied it in the device of the patent in suit, shown in the central figure. In the 1879 device the auxiliary-valve device (red) was actuated by a supplemental piston, but in the 1887 device the supplemental piston was dispensed with and the auxiliary-valve located in the triple-valve casing, in such relation to the piston thereof that the latter was endowed with a new *function* simultaneously with the performance of its old function of opening the main-valve (black) to vent the auxiliary-reservoir air, shown by a red line. The new function consists of opening the auxiliary-valve (red) to vent the train-pipe air, shown by a blue line, thereby resulting in quickening the action of the following brakes in the train, the

same as in the prior device of 1879, except that the auxiliary-valve (red) in 1887 is actuated by the triple-valve piston instead of by a *supplemental* piston, as in 1897. Now, this 1887 device on public trial at Burlington, Iowa, in 1887, failed to apply the brakes throughout the train sufficiently quick, and produced worse shocks than before, and therefore was unsuccessful. (R., p. 128, L. 12.)

THE SUCCESSFUL DEVICE OF 1888. (AT RIGHT HAND OF FOLDER.)

Mr. Westinghouse then constructed the successful device of patent January 21, 1888, not in suit, shown to the right, and again reverted back to his 1879 patent, and in addition to adopting the auxiliary-valve (red) thereof, he also at last adopted the *supplemental* piston (brown) thereof, and combined the *two* with the old triple-valve, so that when the brakes were to be quickly applied, the auxiliary-reservoir air, shown by a red line, was admitted to the brake-cylinder by the main-valve (black), and also to the chamber containing the supplemental piston (brown), and that piston opened the "auxiliary-valve," which vented the train-pipe air, shown by a blue line. With this combination, which is not in suit here, he obtained satisfactory results.

Now, from this history, it is quite obvious the patent in suit was *not* the first to disclose the fundamental law of serial quick-action, as that was made known in 1879 by patent No. 217,838 (R., p. 759), nor was it the first to practically apply *that law*, as that was accomplished in 1888 by the device of the patent No. 376,837 (R., p. 131, L. 12). Therefore, the complainants' contention that the patent in suit is a great, meritorious and pioneer patent is erroneous, and not well founded.

FUNDAMENTAL LAW DISCLOSED PRIOR TO THE
WESTINGHOUSE 1879 PATENT.

Furthermore the fundamental law shown in the 1879 patent to Mr. Westinghouse was not first disclosed by him, as it was

first patented in England (R., p. 68, line 7), March 12th, 1879, No. 980, by Sanders. Mr. Westinghouse was in England about that time, as his signature to the specification of the United States patent, No. 217,838, was witnessed at 17 Grace-Church street, London, E. C. (R., p. 761), and his application for the United States patent was filed May 21st, 1879, (R., p. 759, L. 4), two months after the English patent was published to the world.

VENTING THE TRAIN-PIPE AIR TO THE BRAKE-CYLINDER DIS-
CLOSED PRIOR TO THE WESTINGHOUSE PATENT OF 1887.

Nor was Mr. Westinghouse the first, in the patent in suit, to vent the train-pipe air into the brake-cylinder, to augment the pressure therein, as that was done by Mr. Boyden and patented to him June 26, 1883, and that patent was the cause of the rejection and erasure of Mr. Westinghouse's broad claim from the patent in suit. (R., p. 717, L. 18).

WHY THE DEVICE OF PATENT IN SUIT WAS UNSUCCESSFUL.

Now, let us see why the device failed. It will be observed that the first device of 1879, and the last, the successful device of 1888, both use auxiliary-valves, but actuate them by *supplemental* pistons; whereas the intermediate device of patent in suit does not use any supplemental piston, but uses the *old further traverse* of the piston to actuate the auxiliary-valve, thereby requiring the said piston to perform a new and *additional function*, or perform the double duty of opening the main valve (black) of the triple-valve to vent the auxiliary-reservoir air, and also opening the *auxiliary-valve* (red) to vent the train-pipe air. This double work necessarily makes the piston move slowly and requires a greater reduction of train-pipe air to actuate it, which results in a piston action *too slow* to sufficiently quicken the application of the brakes throughout the train, therefore *this double work of the piston* is what caused the failure of the device of the patent in suit. This defect was

remedied in the 1888 patent by utilizing the supplemental piston, and thus relieving the triple-valve piston of the extra work.

A SIGNIFICANT FACT.

It is a significant fact that when "auxiliary-valves" are used *successfully* a supplemental piston is used to actuate them, and this fact proves that the defendants' device does not use an auxiliary-valve, and that the main-valve 22 is *not* an auxiliary-valve, because, if it were, the piston would have to perform an *additional function*, and to do double work, and thereby the defendants' device, which has proven successful, would be impracticable, for the reason that the device of patent in suit was unsuccessful.

COMPLAINANTS' EXCUSE AS TO FAILURE OF THE
PATENT DEVICE IN SUIT.

The complainants explain that the failure of the patent in suit was due to no inherent defect, but to the small size of the ports of the valves, and that when the ports were made larger the device worked substantially as well as the 1888 patent, where a supplemental piston is used. Now, there is no testimony which sets forth where and when this was tried or proven to be true, and the fact remains that if it is true, why do the complainants complicate their successful device with a supplemental piston when so simple a thing as *making a port larger* would remedy the defect? The physical facts are, that if they made the port under the auxiliary-valve larger the air-pressure on that valve would be increased, and consequently the resistance to its movement would be increased in the same ratio, thereby resulting in making the piston of the triple-valve move still more slowly, requiring a greater reduction of train-pipe pressure and the brakes would be more retarded than if the ports were the size shown in the patent. The records shows that they experimented with the device of patent in suit several months after its failure at the Burlington trials (R., p. 148, X-Q. 159) and at

last accomplished the desired result only when they reverted back to the supplemental piston of 1879 patent. Their allegations are wholly inconsistent with the facts disclosed by the records and with physical reasons herein given.

COMPLAINANTS' CONTENTION AS TO THE QUICK-ACTION
DEVICE OF 1879 BEING INOPERATIVE.

The records show that the defendants made fifty of the devices of the patent No. 217,838 of 1879 and tested them on a rack equipped with fifty brakes, just as in practice, and the devices *did work as set forth in the patent* (R., p. 669, L. 37), and did greatly quicken the action of the brakes and that they were operative. Now, on the other hand, what does the record show about the operation of the device of patent in suit? It proves that it was a failure (R., p. 126, L. 26), and it required great inventive skill and several months' work to accomplish the result, and then it was not by the device of patent in suit, but by another device for which they procured the 1888 patent. It is therefore submitted that if, according to complainants' contention, the first device (1879) was inoperative, and therefore should not be favorably considered, why should the second device (1887) receive favorable consideration since it was proven to be a failure, and is not now used, and never shown in their catalogues (R., p. 149, L. 31). The device of 1879, at least, has the credit of being the first in the United States to show the fundamental law of quick-action, and to show a *supplemental piston* actuating an auxiliary-valve, which are embodied in the successful device of 1888; but the *actuating* of the "auxiliary-valve" by the triple-valve piston, *the leading thing of the patent in suit*, and which the complainants set such stress on here, is not used at all by them or any one else, nor has it ever been used since its failure at Burlington in the spring of 1887.

In calling the attention of the Court to the patent of 1879, which discloses the fundamental law of serial quick-action, and

to the fact that the patent in suit was inoperative to produce the result sought for, and to the other matter just referred to; it is not for the purpose of belittling the patent in suit, but this is done for the purpose of rebutting the great pretensions of counsel as to the *merits* and *pioneership* of that patent, and their efforts to have it construed for something more than the facts surrounding it warrant.

SUMMARY.

First: That the complainants' invention consists of the old automatic brake plus a second machine consisting of: (A) an additional passage; (B) an auxiliary-valve controlling the said passage; and (C) endowing the triple-valve piston with a *new or additional function*: i. e., to actuate the said auxiliary-valve.

That the defendants' device does not contain an additional passage or an auxiliary-valve or use the piston to perform a *new or additional function*: and, therefore, is for a wholly different invention, and does not come within any claim of the patent in suit.

Second: That the complainants' contention and assertions as to the patent in suit being meritorious and pioneer, are fallacious and not supported by acts, for instead of possessing these qualities, that device is simply an unsuccessful patent which does not possess even the merit of being the first to disclose the fundamental law of quick-action, nor of being the first to reduce that law to practice and, therefore, should not be construed by this Court to be for anything more than just what it fairly describes.

Third: That the defendants' invention is meritorious as being the first to disclose that the triple-valve *per se* possessed in itself latent powers to vent the train-pipe air without complicating the automatic-brake system with additional or auxiliary-valve devices of any kind; and further, that this great change was brought about by the most simple means imaginable (Partition 9). A device that cannot get out of order, that needs

no repairing, and which is absolutely sure to act when called on in emergency to prevent loss of life and the destruction of property.

Fourth: To hold the defendants' device an infringement of the *unsuccessful* and the *unused* (R., p. 149, L. 36), device of the patent in suit would tend to discourage rather than encourage progress in mechanical art, and, furthermore, not only prevent the railroad companies from using a device that had advanced the art one step forward, but would maintain a monopoly that last year netted over two million, six hundred thousand dollars profit, and cut the railroad road companies off from the benefit of competition in supplying themselves with air-brakes, which, by law, they are required to use, and that, too, by a patent for a device which the railroad companies decided *not* to use after being tested by the most proficient experts in the country, the Master Car Builders' Committee, who reported, in 1887, after the test at Burlington of the device of the patent in suit, that "the field for improvement was open as wide as in 1886." (R., p. 126, L. 26).

Fifth: We consider that it is proper and just to construe the claims of the complainants' patent so as to cover the invention described therein; but should not be expanded so as to cover the defendants' device, which does not use the invention described in the complainants' patent as a whole or in one detail, and which operates by an entirely different mode of operation.

Respectfully submitted,

LYSANDER HILL,
Of Counsel for Defendants.

APPENDIX

IN ANSWER TO

PLAINTIFFS' SUPPLEMENTAL BRIEF.

Further Traverse of the Piston.

The great theme of complainants' counsel is, the utilization of the "further traverse" of the triple valve piston to do work that it never did before, by which great and beneficial results are accomplished. For the first time in this litigation they now concede before this Court that the *further traverse* is old, but they say it possessed defects, and Mr. Westinghouse's "remarkable invention in suit converted the cause of difficulty into an element of success." On page 3 of supplemental brief they solicit the admiration of the Court, when dilating on the further traverse, by stating that—

"Such triumphs in mechanics are only achieved by
"those whose genius is of the supreme quality which
"enables a commander to snatch victory from defeat."

And Mr. Betts, in the most impressive manner, told this Court in substance at the prior argument, that—

‘When in case of an emergency, as when a draw-bridge was open or a switch misplaced, or some deadly danger ahead, that then the engineer, by the means at his control, could utilize the further traverse of the piston *‘to perform a new function’*—to do work it never did before, and thereby vent the train-pipe air, which instantly causes the brakes to be applied throughout the train with lightning-like rapidity, and with the greatest available force, resulting in saving the lives and limbs of numerous passengers, and the property of the railroad company; and that the utilization of the *‘further traverse of the piston to do work that it never did before* is the great and underlying principle of Mr. Westinghouse’s invention, and one that well deserves a broad and liberal construction by the Courts; and as claim 2 more *nearly* covers that invention, it should not be limited ‘by a *slavish* adoption of the *identical* instrumentalities shown.’

Now, the alleged facts set forth in this argument can safely be conceded by defendants, for the very reason that this great and underlying principle contended for—to wit, the further traverse of the piston “*performing a new function*” and doing work that it did not do before, by which train-pipe air is vented, **is not used by defendants**. And further, this very point forms the parting of the ways between the complainants’ and defendants’ respective inventions.

Mr. Westinghouse took the old triple-valve (patent 220,556) and when the piston made its old “further traverse” to open the main-valve (black) to admit auxiliary-reservoir air to the brake-cylinder for emergency applications of the brakes, as it always did, he utilized that old further traverse of the piston and caused it to do *additional work*, that of opening an auxiliary-valve which did not previously exist in triple-valves, to

vented the train-pipe air, thereby Mr. Westinghouse endowed the *further traverse* of the piston with "*a new function*."

Now Mr. Boyden in order to reach the result of venting train-pipe air, proceeded on a very different principle from that of utilizing the "*further traverse*" of the piston to do additional work or to "*perform a new function*." He took the old triple-valve and when the piston made its old further traverse to open the main-valve (black) to admit auxiliary-reservoir air to the brake cylinder for emergency applications of the brakes, just as it always has done, he modified the old triple-valve chambers by *inserting a partition*, whereby the maximum air-pressure of 70 lbs was reduced to 5 lbs. in the main-valve chamber, and thereby the train-pipe air is vented through the main-valve simultaneously with the venting of auxiliary-reservoir air, thus not requiring the "*further traverse of the piston*" to do any thing more or less than it always had done. Consequently, conceding as true what counsel for complainants say, as to claim 2 being broadly for the further traverse of the the piston "*performing a new function*" of opening a port, or doing anything else imaginable, more than it did before, by which train-pipe air is vented, the defendant's device, not operating so that the further traverse of the piston "*performs a new function*," cannot be held an infringement of that claim.

Misleading Cuts.

Another procedure of complainants' counsel which calls for serious comment, is the introduction of cuts representing imaginary devices not in the record. These cuts and accompanying statements are essentially misleading. This was resorted to, to a very large extent, in their main brief, but in their supplemental brief they introduce *incomplete* cuts which they pretend represent the different positions and actions of the defendants' valves, but which are wholly erroneous.

Plaintiff's Counsel's Imaginary Valve Positions.

Opposite page 8 plaintiffs' supplemental brief, they show the upper cut opposite, as representing the valves of Boyden structure in the "graduated" position.

It will be noticed that the graduation valve-port (40) is only slightly open with reference to the main-valve, 22, so that air, shown by a red line, can barely enter. This position is absolutely erroneous as the Boyden "graduating valve" never takes any such position. In graduating the small port (40) is open full, as shown by the lower cut opposite, which is the same as shown opposite page 10 of complainants' supplemental brief, which they allege is the position for a "full" application of the brakes.

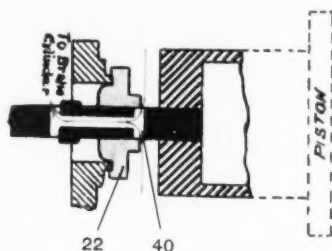
The alleged position in the upper cut is *never* taken, and the position shown in the lower cut is the one *always* taken *for graduation*, and the reason that the small port will never partly open as alleged is, that when the piston once starts to move towards the train-pipe it will not stop until the shoulder of the stem comes in contact with the main-valve, 22, as shown in the lower cut, consequently the port in the graduating valve is always open to its full capacity when graduating.

By this newly-created position (existing nowhere except in the minds of plaintiffs' counsel), of defendants' graduating valve partly opening the port 40 to graduate the brakes shown in the upper cut, the piston would necessarily make its "preliminary traverse;" then to open the graduating port wide for a "full" application of the brakes, shown in the lower cut, the piston would have to make the "further traverse." Now as there are only *two* "traverses" to the piston, we ask how is the main-valve 22 to be opened? The ingenious counsel for Complainants should have invented a *third* traverse to open valve 22, in order to get their erroneous allegations out of this predicament. They have not seemed to realize this, or possibly they did, and this last view might account for the abridgment of the

Cut from Plaintiff's Supplemental Brief.

(Opposite Page 8)

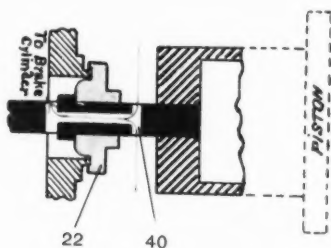
Alleged to represent the graduated position of defendant's Graduating Valve but which position in fact never exists, as port 40 is never partially opened as it always remains full as shown in the lower cut.



Cut from Plaintiff's Supplemental Brief.

(Opposite Page 10)

Alleged to represent the full application position but which in fact truly represents the graduated position.



E.—The only difference between the two cuts is that port 40 is partially open in the upper cut and fully open in the lower cut.

The Valve 22 is *erroneously* colored Red, in order to have the coloring correspond with Plaintiff's cuts, and for the same reason the Graduating Valve is colored Black.



cuts, because if the relative parts had been shown complete, this *discrepancy in the traverses of the piston* would be at once apparent. The court will see the illogical and ridiculous outcome of an argument based on the invention by counsel of imaginary positions shown by cuts not in the record, and which have not been subjected to rebuttal evidence.

Now the plaintiffs' counsel resort in this specious graphic argument about "graduated" and "full" application with the small port 40 in order to reserve the old main-valve 22 of defendants' structure to be classed as the new auxiliary valve of patent in suit.

In this proceeding counsel fails to point out in defendants' structure the valve equivalent to the graduating valve (yellow) of the old patent 220,556 and also in patent in suit, and make the defendants' graduating valve 40 (which they erroneously call the "main-valve") take the place of *both* the graduating-valve (yellow) 29 and the main-valve (black) 14, of patent in suit. This is a startling proposition and is the handiwork of counsel, as the abridged cuts and the imaginary positions are not part of the record.

Plaintiffs' Counsel's Imaginary Air Action.

The phenomenal air action shown in cut opposite following page, reproduced from plaintiff's supplemental brief, page 11, which their counsel allege "*shows an additional operation*" of the train-pipe and reservoir airs (blue and red lines, respectively), in defendants' device, is wholly misleading. This graphically-displayed piece of fiction is even more startling than their previous one on account of the physical impossibility of accomplishing it, although plaintiff's counsel have the boldness to allege that it shows the action of the two airs (blue and red) in defendants' device.

The action that *actually* takes places by the train-pipe air (blue) and auxiliary-reservoir air (red) in defendants' device in a quick-action application of the brakes, is shown in the lower

cut opposite page 69 of this brief, where the two airs enter the triple-valve chamber and there commingle, becoming one air, and as impossible to *separate thereafter* as it would be to separate hot and cold water after they had been united. How, then, is it possible for the *two* airs to separate in the valve-chamber, as illustrated in the cut opposite, and portions of the auxiliary-reservoir air (shown by a red line) seek out the small graduating passage in the valve-stem and pass through it, while the train-pipe air (shown by a blue line) passes through the large port opened by the main valve 22?

To suggest such an absurd, preposterous physical action as this can only be the resort of persons in dire extremity.

This illustration is wholly misleading, and is used in order to *try* to show that in defendants' device, when a quick application takes place, two valves are employed (which is not true), one to vent the auxiliary-reservoir air (red line) and the other train-pipe air (blue line) with the object of making it appear like complainants' device where two valves *are used* in a quick application, viz: the main valve 14 of the triple-valve to vent auxiliary-reservoir air, and the "auxiliary-valve" 41, separate and "*independent*" from the main valve, to vent train-pipe air. The illustration is spurious and purely imaginary. No such operation of *two* valves is found in defendants' device, for the fact is the main-valve 22 (*one valve alone*) admits both airs, or rather the two airs, after they have been united in the valve-chamber which precludes any such ridiculous alleged operation of the two airs as suggested in plaintiffs' illustration.

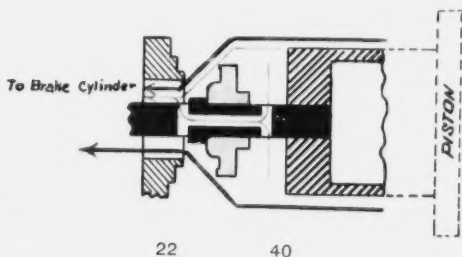
Plaintiffs' Counsel's Imaginary Partition.

Plaintiffs' counsel, realizing the importance of defendants' position in regard to Mr. Boyden's invention of *partitioning* the valve-chamber, by which the old triple-valve is made capable of venting the two airs in quick applications of the brake, have endeavored, by the illustrations opposite page 12 of their supplemental brief (illustrations that are not in evidence), to show

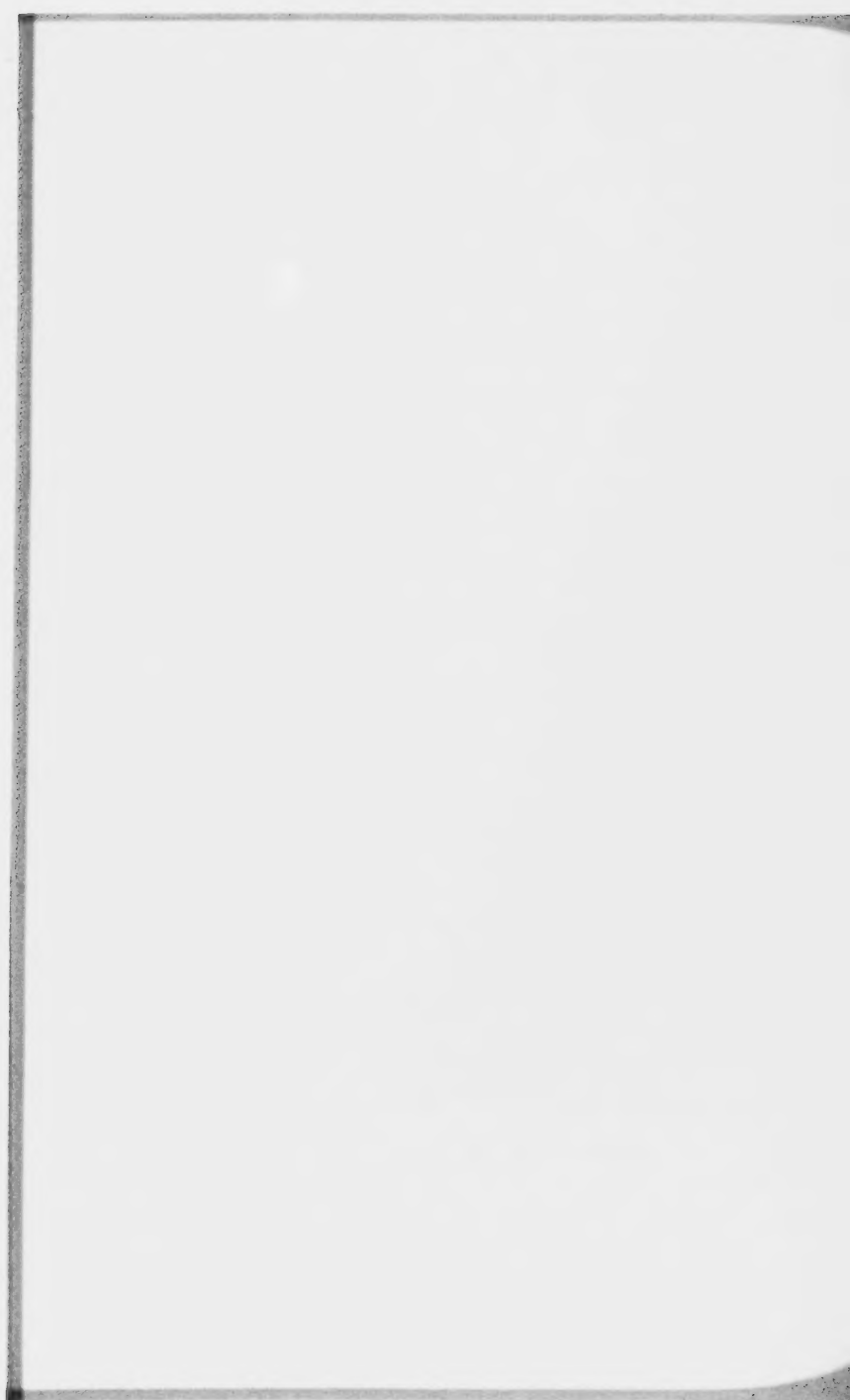
Cut from Plaintiff's Supplemental Brief.

(Opposite Page 11)

Alleged to represent a new operation in the Boyden structure, but which is wholly impossible because the Train Pipe Air (blue line) and Reservoir Air (red line) unite in the Valve Chamber and can never separate thereafter and consequently could not take the diverging and separate courses shown.



NOTE.—The Valve 22 is *erroneously* colored Red, in order to have the coloring correspond with Plaintiff's cut, and for the same reason the Graduating Valve is colored Black.



that plaintiffs' device contains a partition equivalent to Boyden's in order to make it appear that if *such* partition was removed quick action in the plaintiffs' *device* would be destroyed.

This *alleged* "equivalent partition" is marked X in the lower cut of said illustrations. Now, a partition, of course, does exist in plaintiffs' device, as partitions of *some* character must necessarily exist in *all* triple-valve devices, which, if broken or removed, would obviously destroy the quick-action application. But what conceivable bearing can *such* a partition have in the case at bar? The fact that the removal of a portion of the *wall* would destroy quick action, does not prove that *it* is the "equivalent" of Boyden's partition.

The removal of the passage 46 would also destroy quick-action and counsel might, therefore, call *it* the "equivalent" of Boyden's partition, but it would not be true. However, the *wall* marked X does not functionate to make the *old triple-valve* capable of venting train-pipe air in plaintiffs' device, as the defendant's partition 9 does in their device, and therefore the part X is *not* the "equivalent" of the defendants' partition 9. If such were the case, and *that* is Mr. Westinghouse's invention, we ask why did he *add* to the old triple-valve the "auxiliary-valve" 41 and the direct passage 46, which in the patent are designated as "additional members?" And why did he fail to describe such a partition in his patent, if thereby he could dispense with his *additional* members? This cut opposite page 12 of plaintiffs' supplemental brief is another piece of fiction, and the contention of plaintiffs' counsel is treating a very serious subject as though it were a farce, is wholly unwarranted from anything found in the Record, and is totally lacking in the dignity and frankness due to a cause before this Court.

Non-Identity.

The learned and ingenious counsel for plaintiffs, realizing that before claim 2, or any other claim of the patent in suit, can be adjudged to be infringed, *identity* must first be established between the two structures, and knowing truly that to produce

quick-action, plaintiffs' device requires the use of two valves at the final traverse of the piston, viz: the main-valve (black) of the triple-valve to vent auxiliary-reservoir air, and an "*auxiliary-valve*" (red) *added to the triple-valve to vent train-pipe air*; and knowing also that in defendants' device only *one* valve, in fact, is used to vent both the airs, *they must*, in order to establish identity show that defendants' device also employs an "auxiliary valve." Being unsuccessful in this matter in the lower courts, plaintiffs' counsel now proceed to introduce some newly-discovered evidence—some inventions of their own—and produce the erroneous illustrated propositions, the rationale of which would, if advanced before expert engineers, be received with ridicule.

The identity or non-identity being the controlling factor as to the determination of the question of infringement, and the plaintiffs depending on establishing identity by proving the main-valve 22 of defendants' device to be the "auxiliary-valve" of plaintiffs' patent, we desire, before closing, to call the Court's attention to the following fact:

The *main-valve* in all triple-valves is the valve which controls the *main-port* from the auxiliary-reservoir to the brake-cylinder, and is always opened by the "further-traverse" of the piston to admit the full and quick flow of air in applying the brakes for an emergency; and the sensitive "graduating-valve" is a valve *supplementary* to the main-valve, and used to admit air partially and slowly in graduating or making "service stops." The nomenclature was given by Mr. Westinghouse himself, and will be found in claim 1 of his patent 220,556, dated Oct. 14th, 1879, (R. p. 766), where the slide-valve is termed the "main-valve," and the sensitive graduating valve as "an auxiliary-valve operated by the same stem *to close or open a port through the main-valve without necessarily moving the main-valve.*" Boyden's stem, i, j, k, (some-

times marked 40), closes or opens "a port through the main-valve without necessarily moving the main-valve," and therefore corresponds *exactly* to the sensitive graduating valve *e*¹ of Westinghouse's patent 220,556 (marked 29 in the patent in suit), and does not correspond in any respect to the main-valve of either patents. Judge MORRIS and the Circuit Court of Appeals were clearly right, therefore, in holding Boyden's stem-valve, i, j, k, to be the graduating valve, and his poppet-valve 22, the main-valve, of his device; and this fact and the finding by the Court that it is a fact is, we submit, decisive of the whole controversy.

Complainants Have Shifted their Position on the Main Issue.

We desire to call the attention of the Court to the very remarkable and, we submit, very unjust position now assumed before this Court by plaintiffs' counsel.

The patent in suit defines the invention as consisting of the old triple-valve, *provided* with *certain* "additional members" to perform the new function (R., p. 786, L. 5), and describes the "additional members" as an "auxiliary valve 41" and a passage 46 leading from the train-pipe to the brake-cylinder (R., p. 786, L. 8).

The plaintiffs' expert (Newbury), explaining his understanding of the combination of devices in claims 1, 2 and 4, alleged to be infringed, and particularly claim 2, which is considered by plaintiffs to "more nearly cover the invention," states (R., p. 28, L. 17):

"This claim 2, when read in the light of the specification, is for a combination of four essential elements or

"devices combined together to form a brake mechanism," as follows:

- a. A main-air or train-pipe.
- b. A reservoir to be attached to a car.
- c. A brake-cylinder provided with a piston which connects with the brake-shoes of the wheels of the car.
- d. A triple-valve provided with a piston and "*a valve mechanism*," the piston having two traverses * * * the preliminary traverse operating the (triple) valve mechanism for the admission of air from the auxiliary-reservoir to the brake-cylinder, * * * and the further traverse operating the "*valve mechanism*" * * * for the direct admission of air from the train-pipe to the cylinder.

It will be observed in the above that the *auxiliary-valve element* of the combination is termed by the expert "a valve mechanism."

The same expert witness finds that claims 1 and 4 describes substantially the same as above, but instead of designating the new element "a valve mechanism" he says in these claims it is an "auxiliary-valve." This witness then alleges that he finds these combinations in the defendants' device by selecting the valve 22 thereof as the "auxiliary-valve," or "a valve mechanism," as he terms it in claim 2.

Thus the plaintiffs rested their *prima facie* case.

The defendants accordingly answered this position of plaintiffs by showing that their structure does not employ "a valve mechanism" or an "auxiliary-valve" in combination with the triple-valve, and that the valve 22 is not an added or auxiliary-valve, but is the *old original main valve* of the triple-valve, endowed with a greater capability, by which train-pipe air may be vented at the same time it (the main valve) opens to vent auxiliary-reservoir air, thereby simultaneously venting both airs through the main valve, without using an auxiliary-valve and

separate passage, the "additional members" of the patent in suit, or their mechanical equivalent in any form.

The case was thus made up, and the position taken by the plaintiffs was defended on *these lines*, and in due course came before the Court for argument.

The plaintiffs in their briefs, pp. 40-41, used in the two courts below, when summing up the position they had taken as to claims 1, 2 and 4, stated:

"Thus it will be seen that this *quick-action* attachment, consisting of an air conduit or passageway directly from the *train-pipe connection* to the brake-cylinder, and a valve to control it, such valve being itself under control of the triple-piston and so combined with the old automatic brake appliances * * * that *this*, the chief novelty and element of utility of the Westinghouse invention now in controversy, is so made the *subject-matter of EVERY claim in controversy* as to give character and effect thereto, and render the scope of the claims co-extensive with the invention."

On *the issue* thus made up and tried in the Circuit Court, Judge Morris said:

"I have not been able to satisfy myself that Boyden 'makes use of an 'auxiliary-valve' in the sense in which that term is employed in the specification and in some of the claims of the patent No. 360,070 now in suit.' (Rec., p. 844). 'And what Westinghouse meant by the 'auxiliary-valve' * * * is such a valve as he described in his specification, and which is independent of and performs none of the functions of the main-valve of the ordinary triple-valves.' Also 'the defendants' valve 22 must be considered to be the main-valve.' (R., p. 845, l. 2.)

The Circuit Court of Appeals for the Fourth Circuit affirmed Judge Morris, and said: (R., p. 881)

"Boyden's (22) is not an 'auxiliary-valve': it is mechanically the original main-valve of the original triple-valve, and it performs the service which is performed

“by the main-valve of 220,556. It is not the mechanical equivalent of valve four (auxiliary-valve) in the attached apparatus of Westinghouse, simply by reason of its taking part in an emergency service in admitting train-pipe air into the brake-cylinder. In the original triple-valve it (the main-valve) performed no other service than admitting auxiliary-reservoir air into the brake-cylinder; *in Boyden's device it continues to perform that service*, and is made incidentally instrumental in allowing the passage of train-pipe air. The performance incidentally of quick-action service does not make it ‘an auxiliary-valve.’ It is the same valve. The incidental *service* is auxiliary, but the valve itself is the same and unchanged. We think the Circuit Court was correct in its view that the poppet-valve 22 of Boyden is the original main-valve of 220,556.”

Now after judgement in favor of defendants; after these findings of fact; after failing to convince the two Courts below that defendants use “an auxiliary-valve” or “a valve-mechanism” combined with the old triple-valve, complainants come into this Court and shift their position, and take a *new* one, one wholly inconsistent with their *prima facie* case against which the defendants’ defended, which new position is as follows:

The counsel for plaintiffs now define in their brief before this Court, p. 80, the plaintiffs’ invention and patent by saying it consists of—

“Certain features of the structure, which confer upon it its new capacity, viz: (1) the *double* traverse of the piston, (2) a passage or way of access, directly from train-pipe to brake-cylinder, and (3) a valve which *controls* that passage.”

“These features are the essential features of the ‘means’ by which the triple-valve piston, in its ‘further traverse,’ acts to perform its function of admitting air directly from the train-pipe to the brake-cylinder.”

On this important point (essentials) the patent specification is clear and explicit and shows that what complainants' counsel call the "*essential features*" to wit, the passage for train-pipe air, and a valve which controls that passage, are expressly stated to be "*additional members*" to the triple-valve, consisting of an auxiliary-valve 41 and passage 46. (Rec., p. 786, L. 5.)

Again in Westinghouse supplemental brief, more recently filed, on page 27, counsel take the new ground that claim 2 should be read by twice inserting the words "*by opening a port.*" By this they mean the Court to understand that claim 2 has no limitation whatever beyond that expressed literally by its words, except what they indicate by the proposed insertion of the words "*by opening a port,*" in other words, the new position taken by counsel in this court is, that they now regard claim 2 to be broader than they thought it to be at the outset of this litigation. Then, they said of the "auxiliary-valve device:"

"That *this*, the chief novelty and element of utility of
"the Westinghouse invention now in controversy, is so
"made the subject-matter of *every claim in controversy*
"as to give character and effect thereto."

But such is not their view now, they have seen reason in the adverse decisions of the two lower courts to shift their position, and they do not hesitate to do it.

We submit that the position now assumed by plaintiffs' counsel is specious and untenable and should be scanned with caution by the Court. Complainants having been defeated in the lower courts on the position first taken are now resorting to one of the tricks of the sophist, to wit., first, manufacture or assume a *new definition* of terms better suited to their purpose, and second, endeavor to have the facts marshalled and judged according to their new and spurious definitions.

No 99 and 116.

MAR 10 1898
JAMES H. MCKENNEY,
CLERK

Supreme Court of the United States.

James H. McKenney, Clerk.

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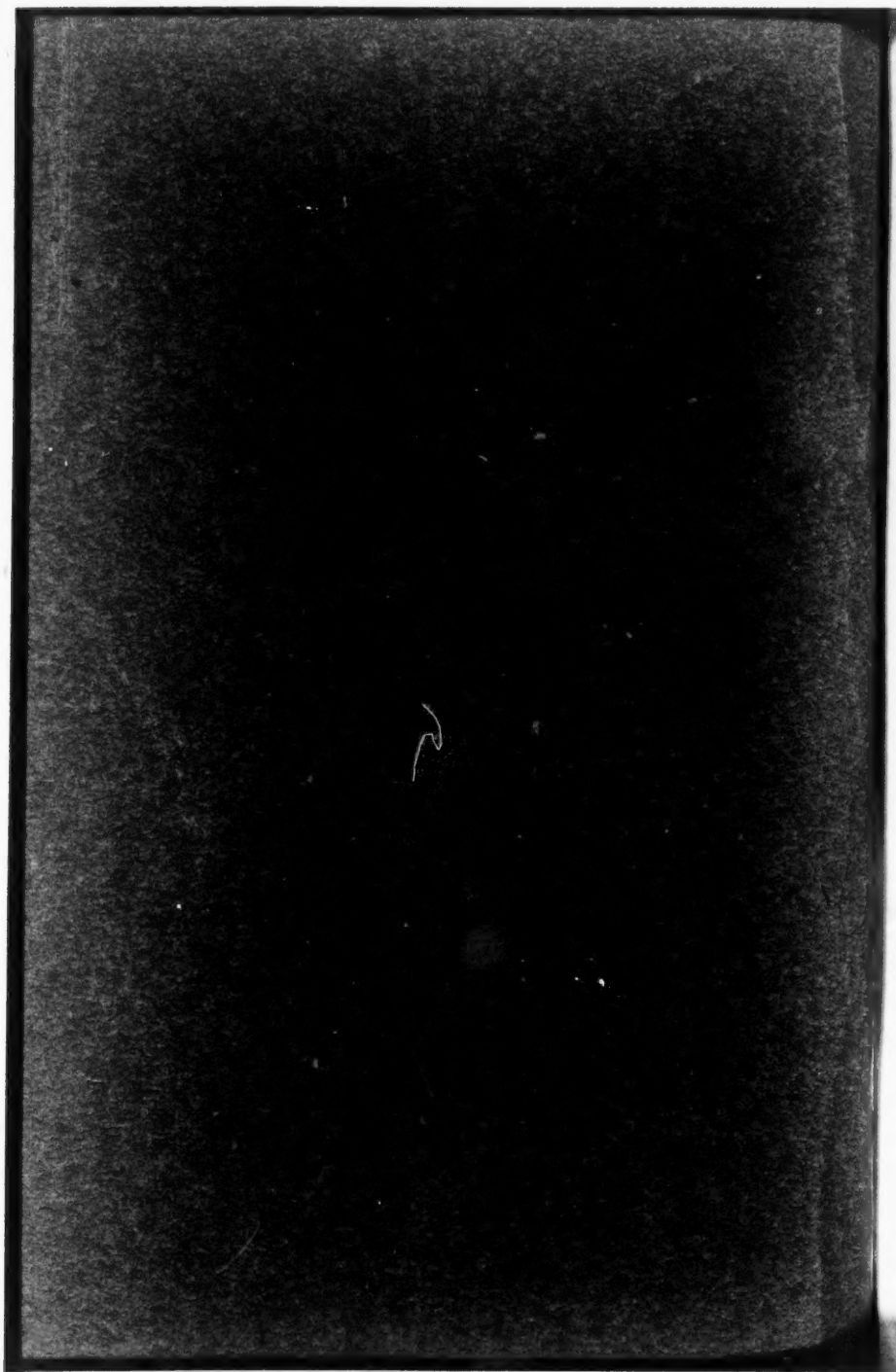
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THE STANDARD

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James H. McKenney, Clerk.

Of Counsel for Defendants



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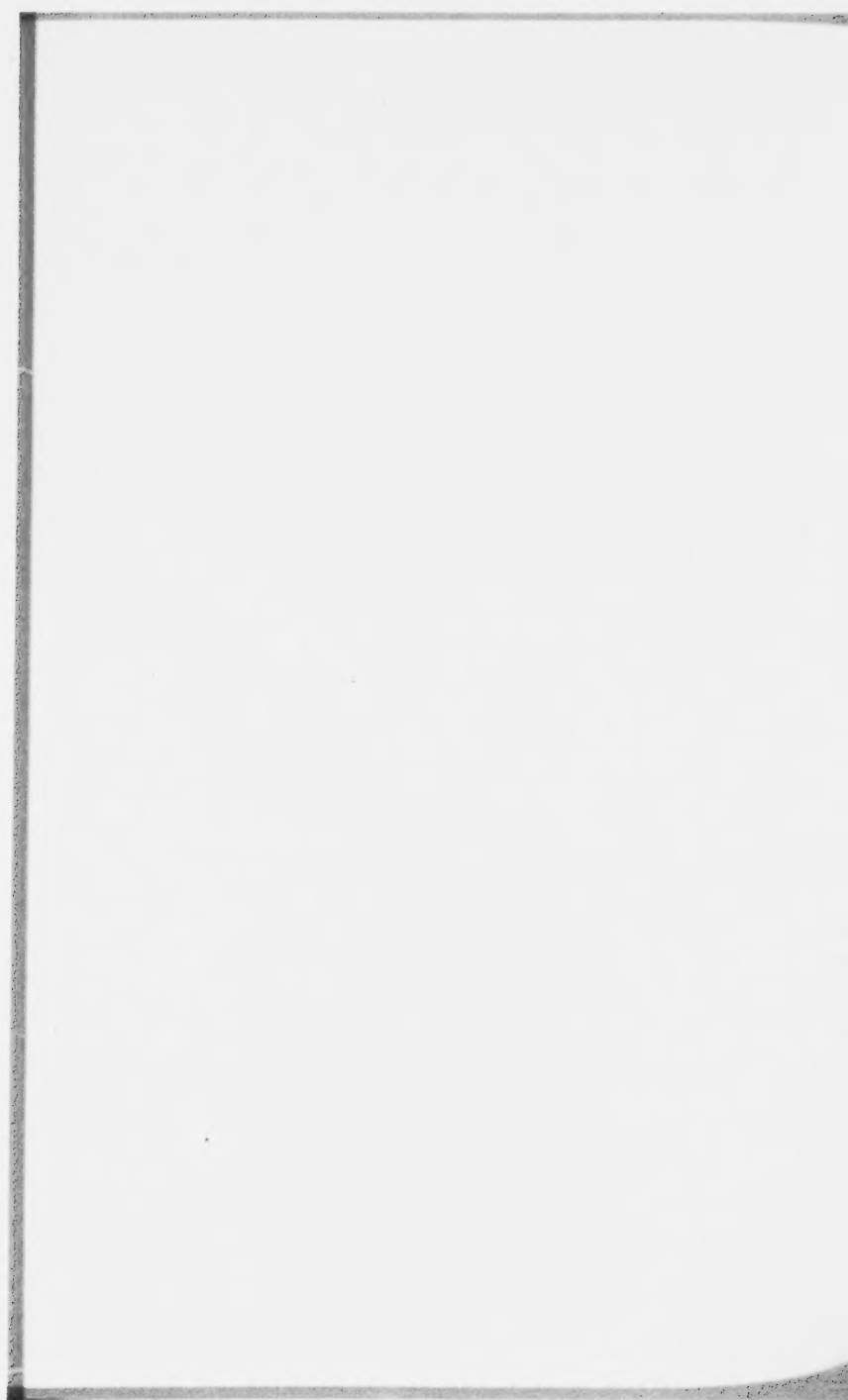
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Supreme Court of the United States.

Westinghouse vs. Boyden==Air-Brake Case

BRIEF FOR DEFENDANTS ON THIRD ARGUMENT.

INTRODUCTORY.

The issue in this case is infringement of patent No. 360,070, granted to George Westinghouse, Jr. The dispute is almost entirely with respect to the lawful scope of this patent, and particularly of claim 2 thereof. Although there are minor disputes, as for example with respect to the philosophy or theory of operation of Defendants' brake, the decision of these would not effect the main dispute, to which we shall here chiefly direct our attention.

We propose, however, to include in this brief an explanation of, or reference to, all matters which are necessary to an understanding of the case. Our reasons for so doing are, first, that one member of the Court was not present at the previous arguments, and second, that we desire to save the Court the labor of examining numerous briefs in order to ascertain our position on the material points in controversy. This is our apology for repeating here explanations of many points that are already well understood by a majority of the Court.

The demand of the Court for a third argument of the case indicates that the main issue has proved difficult and perplexing to the Court, and admonishes counsel to scrutinize and be sure of their premises and of the deductions made therefrom.

The attention of counsel has been specially directed by the Court to the question whether the patent sued on "could be sustained as to process or method;" and the specified elements by which this inquiry

is to be determined are "the state of the art, including the patents of Westinghouse," "the proceedings in the Patent Office," and "the terms of the patent itself."

Although claim 2 of the patent sued on is a claim in terms for a combination of elements constituting an automatic air-brake, and not a claim for a process or method, and although no claim is made in the patent for a process or method, nor is any process or method described in the specification, one contention of Complainants is that this claim should be so construed as to cover the operation of admitting air directly from the train-pipe to the brake-cylinder, whenever that is done *for the purpose* of securing a "quick action" of the brakes.* A claim for a new "process or method" is therefore advanced in the argument, though not made in the patent; or, in other words, Complainants contend for such a construction of claim 2 as, if it be adopted by the Court, would be tantamount to sustaining the claim as to the process or method.

Analysis of this contention discloses that it is based primarily upon the proposition that the invention of the patent sued on is of "primary" character, and that the patent is a "pioneer" patent. The position taken by Complainants' counsel appears to betray recognition of the fact that, if the patent be construed, according to the *ordinary* rule, applicable to *ordinary* patents, (as covering the novel means it discloses and the substantial equivalents thereof) Defendants cannot be held as infringers, and that, therefore, it will be necessary to obtain the aid, in construing the patent, of an *extraordinary* rule, applicable only to *extraordinary* patents, to wit, to so-called "pioneer" patents.

In examining this contention, therefore, we are called upon to answer the following questions:

1. What is a pioneer patent?
2. Is the patent sued on a pioneer patent?

The question of infringement, and the specific question proposed by the Court, may be answered without determining the question of "pioneership;" but this latter question is made a prominent issue by Complainant, and since presumably the Court will pass upon it, it comes within the scope of our discussion.

*It is not contended by Complainants that the patent in suit is the first to disclose this operation, which is admittedly old, but the first to propose it *for a particular purpose*.

The determination of the question of pioneership will depend upon certain material matters of fact. These important or determinative facts are few in number, but it is of the utmost necessity to ascertain these with accuracy, and to apprehend fully their import, for otherwise no step in the deduction which we are called upon to make can be taken with confidence and certainty.

Careful analysis is here required to determine, not only what matters of fact are legitimate premises for the deduction to be made, *but also to distinguish these from facts which are not material to the main issue and cannot be legitimately used as premises in the discussion.* These immaterial facts and illegitimate premises should be rigorously excluded from consideration, and this should be the law of the discussion *for both sides.* We insist, at the outset, upon the importance of this analysis, and of discrimination between material and immaterial matters, because we believe that the main contention of Complainants with respect to the construction and scope of the patent in suit is based upon an illegitimate premise, to wit, upon the achievements claimed for Mr. George Westinghouse, Jr., in the development of the air-brake as the result of inventions made and patented *before* and *after* the particular invention of the patent in suit. What the Court demands to know in this connection is the exact dimensions of the new, practical result attained by the novel means disclosed by the patent in suit. The results of other inventions, whether earlier or later, are material solely for the purpose of *excluding them* from the scope of the patent in suit, and thus arriving with greater certainty at the exact extent of the result accomplished by and due to the specific invention of that patent.

We shall further require in our discussion precise definitions of certain terms of frequent occurrence in this case, so that *whenever such expression is used* it may convey *the same meaning*, and always *that specialized meaning given to it* in this case.

With a firm grasp on these essential things we may enter upon the discussion of the issue with a reasonable expectation of arriving at a sound conclusion with respect thereto.

DEFINITIONS.

The term "Quick-Action Brake" is used in this case with a specialized meaning. What is that meaning?

There is no natural line of demarkation by which brakes can be classified as either "quick-action" or "non-quick-action." In the development of the air-brake during the past thirty years one aim of inventors has been to quicken the action of the brakes as far as practicable. Every time an improvement in this respect has been effected the result has been a brake which had "quick-action" with reference to what preceded it.

Furthermore, the term "quick-action" may have reference to the operation of each *individual* brake, referring to the interval of time between the act which initiates the operation of the individual brake and the full application thereof. Or it may have reference to the operation of a *connected series* of brakes on the several cars of a train, referring to the interval between the act which initiates the operation of the series of brakes and the full application of the *last* of the series. The distinction here to be observed is that between quick action in the *individual* application of the brake on the one hand, and quick action in the *serial* application of the brakes on the other hand.

Prior to the invention of the patent in suit a maximum in quick-action for individual application of air-brakes had been attained. Abrupt application of the brakes with full pressure is not desired in ordinary or "service" stops, and even for "emergency" stops an application of the brakes as abrupt as is desired or needed was obtained from the auxiliary reservoir, the quickness of action being a mere matter of the maximum size of the valve-opening between that reservoir and the brake-cylinder. In modern practice, the brakes are never abruptly applied, in making emergency stops, with the full power available in the auxiliary reservoir, and which was available in the brakes of the prior art. On the contrary, provision is made to *prevent* the abrupt application of this power to the brakes.

But beyond this the brake-mechanism of the prior art was capable of "quick-action" in the *serial* application of the brakes to the full extent necessary for all trains which were equipped with continuous air-brakes up to that time, or for which such equipment was desired by the railroad interests. Until a short time before the patent

sued on no demand had been made by those interests for air-brake equipment, except for passenger trains, which rarely comprise more than ten cars, and usually a much smaller number. For such trains the old brake-mechanism possessed fully the essential of quick-action in serial application, that essential being that *all* the brakes of the train should be "applied or brought into action simultaneously,"* or practically so.

In 1886 the Master Car Builders' Association made a demand upon the manufacturers of brakes for an air-brake which could be successfully used on freight trains comprising as many as fifty cars, and which when used on trains of that length would be effective for making both "service" stops and "emergency" stops, just as was accomplished by existing brake-mechanisms on short trains. That association determined and stated the requirements which such a brake mechanism should fulfil, among these being that "it shall work without shock on a train of fifty cars" (Rec. p. 133). This requires "practically simultaneous" action of the brakes, or to substitute a definite formula for the indefinite statement "practically simultaneous" it requires full application of the last brake on a train of fifty cars within three and one-half seconds from the operation of the engineer's controlling-cock.† No brake which does not accomplish that is a "quick-action brake," as that term is employed in the art and in this case.

Therefore, when we say that the devices of Complainants and of Defendants are "quick-action brakes," we mean that they are brakes which, when employed on a train of fifty cars, will so operate as that the last brake will be fully applied within three and one-half seconds from the opening of the engineer's controlling-valve. The term, as

* Westinghouse patent, No. 217,838, July 22, 1879, p. 760.

† This formula is given in the proceedings of the Master Car Builders' Association of 1895, (p. 245) in the following words: "No. 2. Application Test (b) (Emergency).—Brakes must be applied on the fiftieth car with at least 45 pounds pressure, with 6 inches piston travel, in three seconds from the first movement of the engineer's handle. They should indicate at least 55 pounds in three and one-half (3½) seconds."

Judge Townsend (59 F. R. 585.) defined the "quick-action element" of the modern brakes as being "such an arrangement of the triple-valve on each car as to make the opening of such vents, and the consequent reduction of train pressure *practically simultaneous on each car.*"

applied to the modern brake, has no distinctive reference to the *individual* application of the brakes, but only to the *serial* application thereof, and to the latter only when the series embraces a very large number, as fifty.

Finally, it is to be noted that "quick-action air-brakes," even in the restricted meaning here given to the phrase, had been produced and operated with entire success prior to the invention of the patent in suit. In the successful "quick-action brakes" the opening of the discharge valves for "emergency" stops was effected by the agency of electricity. Hence a further restriction to the meaning of the phrase is necessary, and we must confine it in this discussion to *quick-action* brakes wherein the defined requisite promptness of serial application is effected by the agency of compressed air alone.

When Complainants' counsel say that Westinghouse was the first to invent and produce a "quick-action brake," they mean a brake which fulfills the requirement specified above, when operated by compressed air alone. Any brake which will do that practically is a "quick-action brake" within the meaning that attaches to that term in the art, and in this case. If the brake of the patent in suit accomplished that it is a "quick-action brake;" if not, it is not a "quick-action brake."

Another term for which at least a proximate definition is much needed is "pioneer invention," and, in defining this, we have also to notice the meaning of the phrase "new result" when used in this connection.

The terms "pioneer" and "primary" are used to designate inventions of peculiar importance, and the mark by which an invention of that character is distinguished from other inventions is the accomplishment thereby of an *industrial* or *practical* result, beneficial to mankind, and which had never before been accomplished. Judge Townsend defined a pioneer invention as one which "*for the first time* enabled 'a law of science, or force of nature, to be used so as to accomplish a *practical* and *beneficial* result'" (59 F. R. 592). Every invention, to be patentable, must produce a "new result," that is, it must present some advantage in efficiency or economy over known devices of the same class, or be characterized by some new and meritorious feature of construction or operation. This merely says that an invention, to

be patentable, must be "useful." But the "new result," in order to place the means which attained it in the rank of "pioneer" or "primary" inventions, must be broadly a new *industrial* result. An invention which merely introduced into an old structure a novel feature of operation with an incidental gain in economy or efficiency, without producing a radically new practical result, would not be a "pioneer" invention.*

Bringing together, then, our two definitions to determine what is meant in this case by the expression "the pioneer quick-action air-brake," we find that that expression applies to, and only to, the brake-mechanism, which, *for the first time in the history of the world, accomplished the full serial application of all the brakes on a train of fifty cars within three and one-half seconds by the agency of compressed air alone.*

If the brake mechanism of the patent in suit did this, it is the "pioneer quick-action air-brake," otherwise it is not. We here concede, *argumenti gratia*, that the first employment of a particular agency (air) to perform a particular office (opening the discharge-valves) which had previously been performed by another agency (electricity) to produce an old result ("quick-action" braking), may be properly dignified by the title "pioneer" invention.

It is only by expanding to this extent the term "pioneer" that Complainants can be allowed, without challenge, to say that Westinghouse was the pioneer inventor of the "quick-action air-brake." Allowing this latitude of meaning, the pertinent question is, was this "pioneer quick-action air-brake," or were the means by which "quick-action" was for the first time accomplished, patented *in and by the patent in suit*? Consulting the briefs of Complainants' counsel for their position on this question, we find that, while they assert with great earnestness that Westinghouse *was* the first to produce the new industrial results of "quick-action" (as above defined) by the use of compressed air alone, they base this assertion on the sum of the results of several inventions patented to Westinghouse, some before, and one (a very

* For example, in the leading case, *Morley Mach. Co. v. Lancaster* (129 U. S. 273) the patent was held to be a "pioneer," because the Court found that Morley was "the first inventor of an automatic button sewing machine." In *McCormick Mach. Co. v. Aultman* (C. C. A. 69, F. R. 371) the inventor was held to be a pioneer, because the invention of the "Gorham patent was the first which successfully bound grain with twine in the field."

important one) *after* the patent in suit. When we look in their brief and arguments for the definite description of that new industrial result which *the invention of the patent sued on* accomplished for the first time in the history of the world, and which, therefore, identifies *it* as a "pioneer" invention, we find that they are not able to attribute to it *any* new industrial result. They here substitute for a new *result* what is merely an *operation* (not in itself *new*), and which might not, and, in fact, *did not*, accomplish the specified *result*. They say on this point—

"*This discharge of the TRAIN-PIPE into the brake-cylinder to produce QUICK-ACTION was absolutely new with him.*" (Westinghouse).*

The italics and capitals in the quotation are those of Complainants' counsel (main brief, p. 17).

Manifestly this assertion—the extreme statement which Complainants' counsel feel justified in making in respect of the result attained *by the patent in suit*—is merely a statement of a *particular place of discharge of the train-pipe*, qualified by a reference to the *object* which the inventor *designed* to produce by discharging the train-pipe into that particular place, and which, without that qualification, would not be a true statement. The force of even this qualified statement is much diminished, if not completely neutralized, by having in view the facts for which counsel were endeavoring to make proper allowance in this extremely guarded statement. These facts are briefly—

1. That the discharge of the train-pipe at the *same points*, by the *same means* (reduction of train-pipe pressure opening valves at suitable intervals along the train-pipe) and for the *same purpose* ("to produce quick-action") was old.†

* The contention of Complainants, to which we shall largely devote attention, is that stated in their main brief filed at the first argument, and which is built upon the proposition that Westinghouse was the "pioneer" inventor of the "quick-action" brake. This proposition necessarily assumes that the *patent in suit* is the patent for that pioneer invention. Complainants' counsel do not assert this, but by dextrous use of language seek to establish it by inference without putting it in issue by direct assertion. We do not know what ground Complainants' counsel will take on this third argument, for they have not always been consistent, and have, on at least one previous occasion, retreated from the contention of pioneership and stood on the proposition that Westinghouse, by the patent in suit, accomplished (not "quick-action") but a more powerful *individual* application of the brakes; that he did this by the further traverse of the piston (which had never been used before for that purpose), and that Defendants accomplished the same result by the same means, and hence infringe claim 2. This view of the case will be fully considered herein.

† Westinghouse patent No. 217,838 (p. 759)

2. That the discharge of the train-pipe "into the brake-cylinder" with the results that necessarily attend that operation *per se* (though not to produce "quick-action") was old.*

3. That, while the *object* sought by "this discharge of the train-pipe into the brake-cylinder" might have been "to produce quick-action" it failed of its object, and that the *result* achieved thereby in respect of quickening the action of successive brakes, was precisely that attained when the discharge of the train-pipe was to the atmosphere, as in the prior art.†

In making the foregoing needed definitions we have brought into view some of the material facts and matters by which the issue must be determined, and particularly have we done so in noting the facts which hampered Complainants' counsel in their attempt to describe a "new result" as accomplished by the patent in suit. What is now of immediate importance is to establish firmly that we have stated those facts fairly and accurately. This brings us to a determination of *the departures presented by the patent sued on from structures of the same class existing previously in the art, and of the practical results of those departures.*

This is to be determined by comparing the structure, operation and result of the patent in suit, with the structures, operations and results of the prior art, including the previous inventions of Westinghouse himself.

It is particularly to be noted that these previous inventions of this patentee can be referred to in the present case *solely for the purpose of limiting and defining the scope of the patent sued on.* (James v. Campbell, 104 U. S., 356.) The merit due to them can be considered in this discussion only to *diminish* the merit to be ascribed to the invention of the patent in suit, and cannot by any possibility be considered to *magnify* the importance of that specific invention.

In all the briefs and arguments that have been presented, here and in the Courts below, the great credit said to be due to Mr. Westinghouse for the development of the air-brake has been urged as a fact which ought to influence the judicial mind to place a broad interpretation upon the particular patent sued on. On the other hand, we contend that the merits of this patentee, as an inventor, so far as they

* Boyden patent, 1883, No. 280,285 (p. 776)

† Dep'n H. H. Westinghouse, p. 124, fol. 185.

have the slightest bearing upon any question before this Court, are precisely such as they would be if this were the only improvement he had ever made, and this the only patent that had ever been granted to him. *For the purpose of adjudicating the issues of this cause justice must be blind to every achievement of this patentee, save that only which was accomplished by the invention of this patent. Other inventions of the same patentee, earlier and later, have the same bearing as if they were the inventions of strangers.*

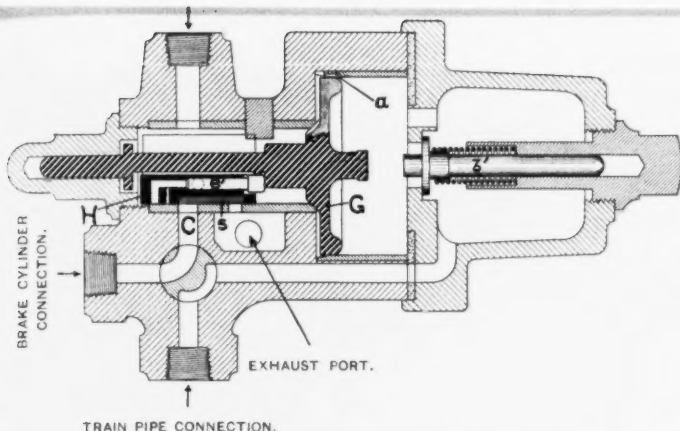
THE NOVELTY IN CONSTRUCTION AND OPERATION OF THE MECHANISM OF THE PATENT IN SUIT.

The patent sued on, No. 360,070, we shall, for the sake of clearness and to avoid the obscurity due to the use of meaningless numbers, designate hereafter as the "auxiliary-valve patent in suit," designating other patents to which frequent reference is made by appropriate titles which suggest the inventions covered by them.

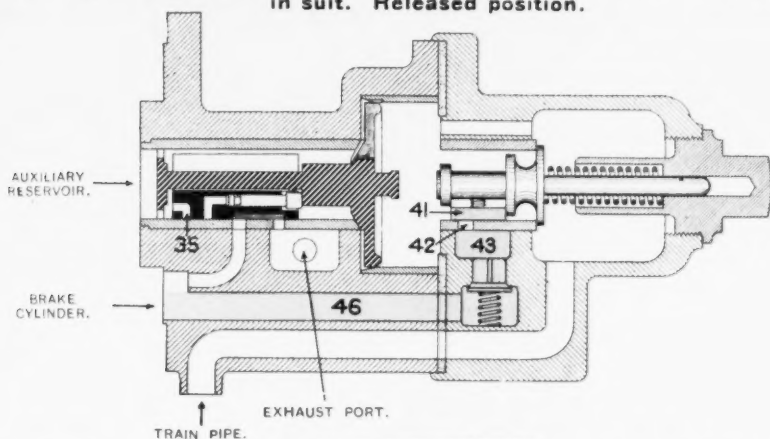
There is no difficulty at all in determining accurately what new thing or things the patentee did in and by the structure of the patent in suit. The difficulty is not met, and the dispute does not arise until the attempt is made to base upon those new features a construction of the patent which will both stand the test of comparison with the prior art, and at the same time clearly embrace Defendants' brake.

What Westinghouse did by this invention was to add to the old triple-valve structures (such as No. 220,556, of 1879, which we will call the "old automatic triple-valve patent") certain "additional members" (as the patent states), these members being a by-passage from the train-pipe to the brake-cylinder, short circuiting—so to speak—the triple-valve chamber, and an auxiliary-valve controlling it and normally cutting off the communication between it and the train-pipe; and he opened this "auxiliary"-valve by means of the usual spring-pressed stem with which the piston made contact, and which it displaced when making its usual "further" or complete traverse for the purpose of an "emergency" stop.

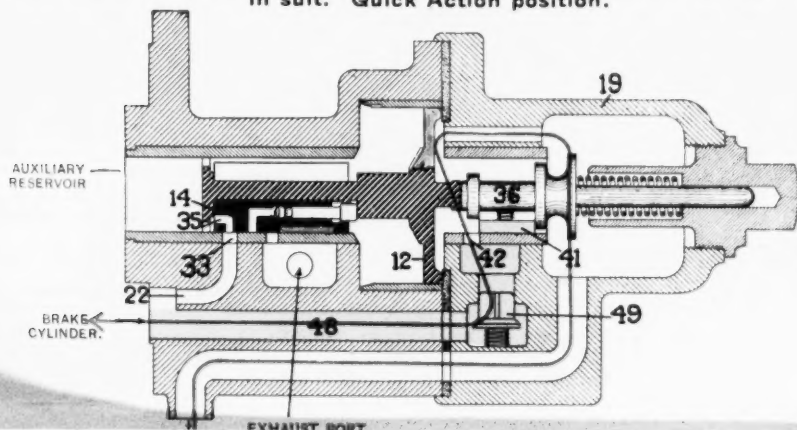
The diagram opposite this page illustrates the structure of the auxiliary-valve patent in suit. Ignoring the parts colored red (which represent the quick-action attachment) we have the old "triple-valve" mechanism of the old automatic triple-valve patent, No. 220,556.



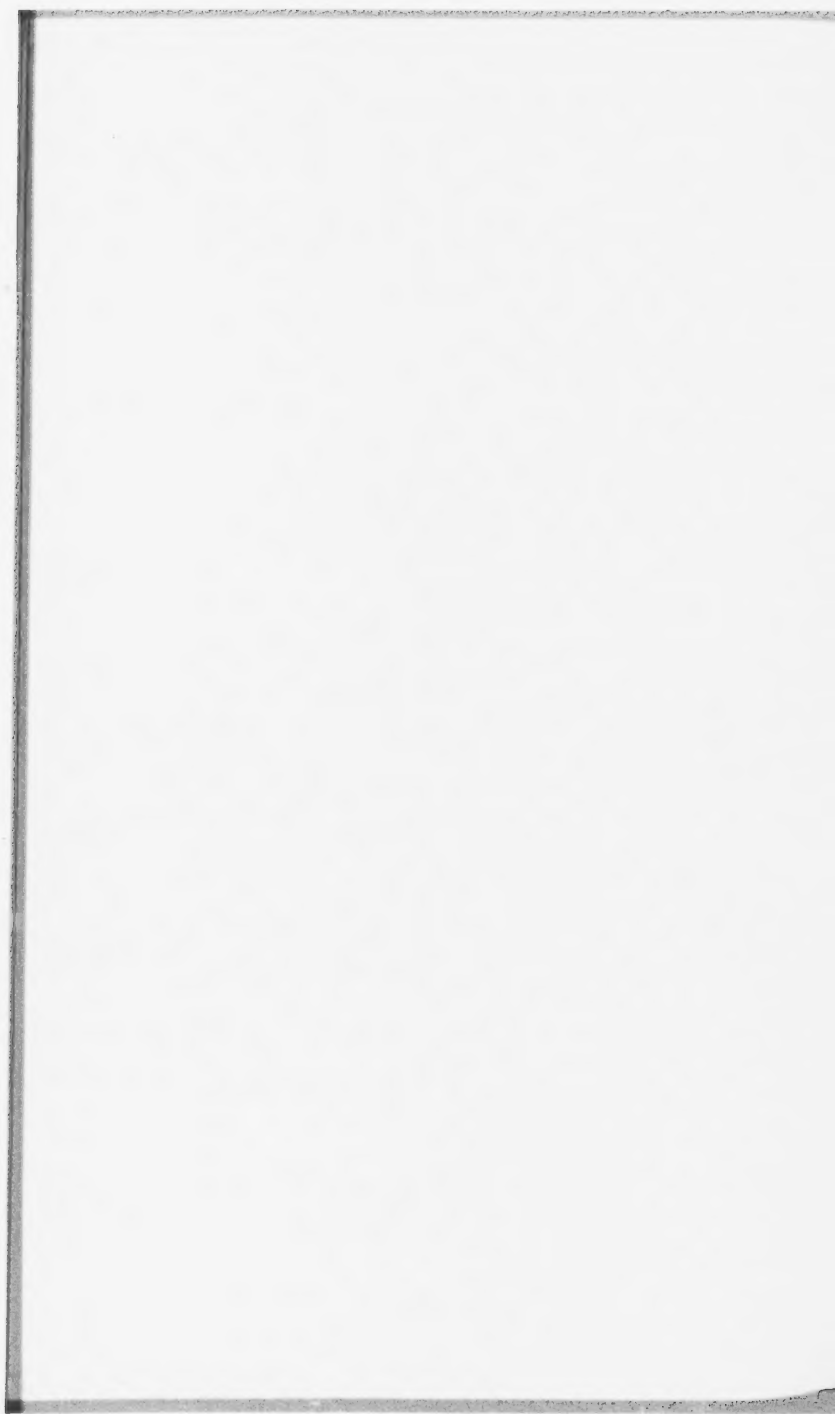
Old Triple Valve device, plus the "Auxiliary Valve device" of the patent in suit. Released position.



Old Triple Valve device, plus the "Auxiliary Valve device" of the patent in suit. Quick Action position.



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The triple-valve takes its name from the presence of three valves in a common valve-chamber. These are, *first*, the "feed-in" valve *a*, colored blue, the "release"-valve *s*, colored green, and the "main-valve" *H*, colored black. These valves have a common actuating organ, to wit, the piston *G*, which, in turn, is moved by varying the air pressure in the train-pipe. The main-valve *H* controls the passage *C*, leading from the valve-chamber to the brake-cylinder. As usual in triple-valves of the prior art, the main-valve has a subordinate member, termed the "graduating"-valve (colored yellow in the cuts), whose function is, upon a slight reduction of train-pipe pressure and a correspondingly slight movement of the piston *G*, to uncover a relatively small part of passage *C*, and thus admit air from the auxiliary-reservoir to the brake-cylinder, applying the brakes gradually and with moderate pressure. Thus, while we find in the old automatic brake a *fourth* valve, if we regard this (as it is in fact) as but a subordinate member or part of the main-valve, the term "triple-valve" is not inappropriate.

When, on a greater reduction of pressure in the train-pipe, the piston is moved still further forward, making its "further traverse," it moves the main-valve so as to fully open the port *C*. This port *C* is larger than that controlled by the graduating (yellow) valve, thus admitting air more rapidly and abundantly, and thereby producing a quicker maximum application of the brakes. This further movement of the piston was always resorted to in emergencies, or whenever it was desired to stop the train quickly.

In this "further" or "emergency" traverse of the piston it made contact with the end of stem 36, and displaced the latter against the pressure of its spring. In the old brakes this stem performed no office except to check the piston at the end of its preliminary traverse.

By the patent in suit the parts colored red were added to this old structure. These added parts comprise a passage, 46, from the train pipe side of the piston to the brake-cylinder, and an "auxiliary"-valve, 41, normally closing said passage. This auxiliary-valve was mechanically connected with the stem, 36, so that this plunger performed the new office of actuating this valve, while the piston performed its old office of displacing stem, 36. It may be said that indirectly the piston performs a new office, in that it actuates stem, 36, and through it valve, 41. But in the same sense it may

with equal accuracy be said that, by reason of the addition of valve, 41, the engineer's-valve on the locomotive performs a new office, because it indirectly actuates valve 41.

The operation is such that when the engineer operates his valve, as before, and the pressure is reduced as before, and the piston makes its further traverse as before, and stem, 36, is displaced as before, valve 41 will be opened by said stem, and the air in the train-pipe will discharge into passage, 46, and thus quicken the action of the brake next in series.

Here then is the basis which Complainant's counsel have for stating that, in the brake of the auxiliary-valve patent in suit, the further traverse of the piston produces a new effect, or performs a new *operation*, to wit, discharging the train-pipe into the brake-cylinder.

What were really the *new* means which performed, in this structure, the indicated operation is a controverted matter and one which must be decided before the test for infringement can be applied.

In this structure and its operation we have also the basis (if any there be) for the contention that the patent can be sustained as to method or process; although before that question can be answered the extent of novelty in the structure and its operation must be determined by reference to the prior art.

If it be held that the patent can be sustained for this process or method, the further question remains, does the brake of the Defendants, when used to produce quick-action, employ this process; i. e., does it have a piston, which, by a further traverse, "admits air directly from the train-pipe to the brake-cylinder?"

THE PRACTICAL RESULTS ACCOMPLISHED BY THE INVENTION OF THE PATENT SUED ON.

No exception will be taken, we think, to the accuracy of the foregoing statement of the novel features of construction and operation in the patented brake. We will, therefore, not interrupt the thread of the argument at this point to make minute explanations of the new structure, or minute comparisons thereof with old structures.

We have now to ascertain the *practical result* of this invention with special reference to the advance made thereby in the direction of producing a "quick-action brake." On this point we will depend upon

the deposition of Mr. H. H. Westinghouse, general manager of the Westinghouse Air Brake Company. This matter must be determined for its bearing on the question of "pioneership," but the chief importance of the inquiry, in our minds, is to determine with certainty what is the *cause* of "quick-action," and what are the *agencies* through which that cause operates in Complainants' brake to produce that result. These *agencies*, if new, are the patentable "means."

The brake of the patent in suit was specially designed to remove the difficulty which prevented the old automatic triple-valve of patent No. 220,556, then in general use, from being employed on long trains—that difficulty was the lack of sufficiently close approach to *simultaneous application of all the brakes*. The interval between the application of successive brakes on a train of fifty cars produced violent shocks, due to the fact that the forward cars of the train were checked before the speed of the cars further from the locomotive was diminished. Stated with precision, it was found that on a train of fifty cars, equipped with the standard automatic brakes, it required *twelve seconds* to apply fully the brakes of the last car.

This slowness of serial application was due to the fact that the air discharged from the long train-pipe to operate the brakes had only a single discharge opening, which was located at the engineer's valve, and hence the effect of opening that valve was not felt at the last brake until an appreciable time after the first brake was fully set (p. 123).

These old automatic brakes, under the conditions specified, were fully tested at Burlington in 1886, and in the report of the Master Car Builders of June, 1887 (p. 118), the result was summed up by this statement:

"The result of these 1886 tests was disappointing. None of the competitors, in the estimation of your committee, did satisfactory work, *owing to the violent shocks produced in stopping.*"

In other respects the results appeared to be satisfactory, for while "the expected delays in discharging and releasing continuous brakes were shown to be of no moment, * * * the objection of *successive application* was developed to an extent calling for the most serious consideration."

The violence of the shocks or collisions was registered in these tests by an apparatus called a "slidometer." A movement of 12

inches of the slidometer was found to be injurious to live stock and equipment, while movements of from 12 to 20 inches were destructive (p. 119.) "With the train fitted with the Westinghouse 'automatic' brake the maximum shock was *forty-nine* inches on 'emergency' applications" (p. 120.)

The principal object then to be attained was to prevent those shocks by bringing about quicker "*successive* application" of the brakes, which was shown to be the one thing needful. The cause of this slowness was well known, and Mr. Westinghouse had many years previously perceived that practically simultaneous action of all the brakes could be brought about by providing the train-pipe with a number of doors or exits for the air (one under each car), by opening which the air could discharge, thus quickly relieving the pressure along the entire length of train-pipe. He also perceived that these doors could be made to open *by the reduction of pressure* in the train-pipe itself. All this he had disclosed, and the means for effecting it he had patented in 1879, patent No. 217,838, which we will hereafter call the 1879 "local-vent" patent.

In that patent he had *not* thought of operating these discharge valves through the intermediary of the triple-valve piston; but he provided, as the actuating motor for each discharge valve, a separate or supplementary piston.

The object of the invention of this 1879 local-vent patent (No. 217,838) is thus stated in the specification thereof.

"It sometimes happens with such brake apparatus, especially *in case of accident*, that material advantage could be effected by having *all the brakes of the train applied or brought into action simultaneously, or as nearly so as possible*. To accomplish this it is only necessary to make provision for the *simultaneous opening of one or more ports in the air conduit passages at points not remote from each auxiliary reservoir*" (p. 759, last paragraph.)

The patent describes the accomplishment of this by placing discharge-valves at intervals in the train-pipe, these valves being opened by a *fall of pressure in the train-pipe*, just as in modern practice.

In the course of taking testimony in this cause defendants proved, by the equipment of a rack containing fifty brakes provided with this "quick-action element" of 1879, that these devices were

operative and that the time of full application of all the brakes was reduced thereby to less than half (p. 695. Q. 8.) Exception has been taken by Complainants to the conclusiveness of these tests, and they rely on expert testimony to the effect that the device invented by Mr. Westinghouse, and patented by him in the 1879 local-vent patent as a new and useful invention, was in reality an *inoperative* contrivance. This contention is not established by the testimony, but the controversy need not be pursued here, for the material matter is fully proved by the testimony of Mr. H. H. Westinghouse, who proceeds to describe what was done immediately after the Burlington trials of 1886. He describes, at the bottom of page 123, the operation of the old automatic brake, with its triple-valve mechanism and piston, pointing out that "it is only for *emergency* or quick stops that the final and complete movement of this piston and valve is required." He then says (p. 124):

"Advantage was taken of these conditions to arrange an
 " *auxiliary device* controlling communication between the
 " train-pipe and *the atmosphere*, which was caused to operate
 " *by the final or complete travel of the piston of the triple valve*
 " when a considerable reduction of pressure was made at one
 " end of the train-pipe for emergency or quick stops. With
 " the aid of this device there was a complete exhaustion of the
 " air from the train-pipe at each triple-valve, which accelerated
 " the operation of the brakes *to a degree that reduced the time*
 " *of full application on the last car from twelve seconds to six.*"

Particular attention is called to two facts here stated by Mr. Westinghouse: *First*, that the arrangement by which this result was accomplished employed the old means of *local venting in the form proposed in the 1879 local vent patent*, that is to say, the vents in the train-pipe discharged *to the atmosphere*; *second*, that the auxiliary-valve device which controlled the vent in each brake was "CAUSED TO OPERATE BY THE FINAL OR COMPLETE TRAVEL OF THE PISTON."

Here we have the "final or complete travel of the piston," operating the discharge valve of the 1879 local-vent patent. It would seem quite natural to employ this organ for this purpose, seeing that the office of the piston always has been to operate the valves of the brake mechanism, and one valve, more or less, would seem to make

no great difference; but, as will presently appear, the official tests showed that the piston was not capable of opening the discharge valves with the requisite promptness.

It will be noted that this result, obtained by the means disclosed by the 1879 local-vent patent, absolutely confirms the correctness of Mr. Boyden's conclusions. It is with *this result*, namely, application of all the brakes of a fifty-car train in *six seconds*, that the result obtained by the brake of the patent in suit is to be compared.

The cut opposite this page illustrates the arrangement here described by Mr. Westinghouse. The parts are in all respect like the corresponding parts of the patent in suit, with the exception that the discharge passages, vent to the atmosphere. It will be noted that, when this construction is modified by connecting the end of the passage H which discharges to the atmosphere so that it will discharge to the brake-cylinder, as indicated by dotted lines, the operation of the piston remains unchanged.

This arrangement, in which the "further traverse of the piston" *operates an auxiliary discharge valve permitting air from the train-pipe to discharge to the atmosphere*, does not appear by any evidence in the case to have been the invention of Mr. George Westinghouse, Jr., and we have reason for asserting that no such contention will be made by the other side. It suffices for our purpose that this arrangement is *excluded* from the patent sued on, which is in terms limited to that modification thereof wherein the passage controlled by the auxiliary discharge valve *connects with the brake-cylinder*.

From this testimony we can also get the measure of the distinctive new departure pointed out in the patent sued on, and which is the salient feature of every claim, to wit: leading the passage, through which the train-pipe air discharged at each brake, to the *brake-cylinder*, instead of to the *atmosphere*.

In the next paragraph to that last quoted (p. 124) the witness (H. H. Westinghouse) describes as the next step in the progress of development of quick-action brakes, the invention of the patent in suit, which he appropriately terms a "modification" of the arrangement last described.

The effectiveness of the invention patented in the 1879 local-vent patent to produce the desired effect, *i. e.*, to cause "nearly uniform application of all brakes *practically coincident* with the exhaustion of

Cut of arrangement described by H. H. Westinghouse, whereof the
 Invention of the Patent sued on is a "modification."

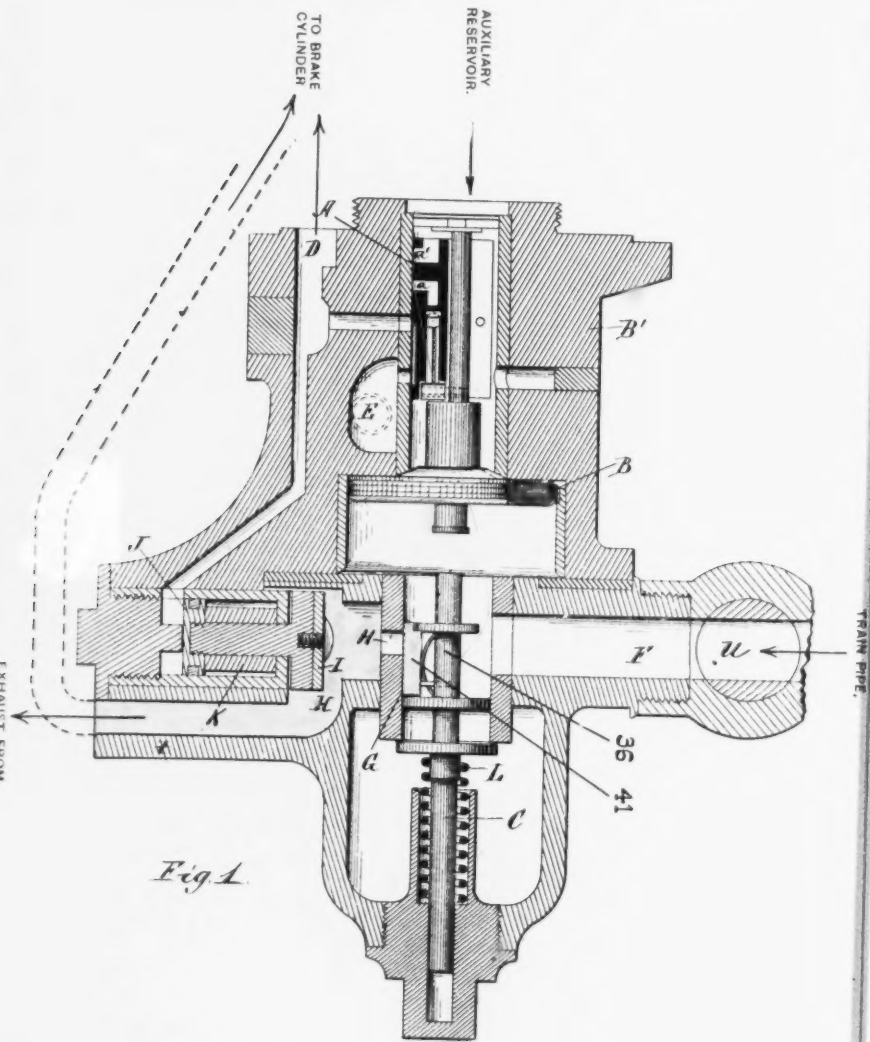


Fig. 1.

The Auxiliary Valve venting to atmosphere operated by the further traverse of the
 piston. (H. H. Westinghouse, Dep. p. 124, line 3.) Auxiliary Valve and discharge passage
 colored Red.



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air at the forward end of the train-pipe" was experimentally demonstrated before taking any step in the construction of these test brakes. Mr. Westinghouse says (p. 123):

"By placing in the train-pipe at regular intervals a form of delicately adjusted exhaust-valve, it was found possible to cause them to operate by the moderate reduction used in 'service' applications. The operation of these valves caused air to be exhausted from the train-pipe, *wherever they were located*, and their action being *nearly simultaneous*, the effect of their operation was to cause *a nearly uniform application of all the brakes practically coincident with the exhaustion of the air at the forward end of the train-pipe.*"

It clearly appears then that it only remained to determine by trial whether the auxiliary discharge-valves could be opened promptly by the triple-valve piston. What would happen if they were promptly opened was already well ascertained.

The test of the invention of the patent in suit then was a trial of the ability of the triple-valve piston to attend properly to the duty of opening *this new valve*, in addition to the like duties it performed for the other valves.

The witness proceeds to testify (p. 125) that a train of fifty cars was equipped with brakes constructed on the plan of the patent in suit, for the purpose of the second trials, which occurred at Burlington in May, 1887.

Exhaust-valve mechanism was also provided "to be operated by electricity, capable of being inserted in the train-pipe as frequently as circumstances proved necessary." *Two* of these valve devices placed at regular intervals in the brake-pipe, were found to be sufficient to produce an *instantaneous and uniform application of all the brakes of a fifty-car train* (p. 125.)

The results obtained by the system when using the discharge-valves venting to the atmosphere and operated by electricity were, in the words of Mr. Westinghouse, that "*the desired coincidence of operation was secured and stops were made without perceptible shock*" (p. 126.)

The official report states that:

"This type of brake possesses four distinct advantages:

"(a) It stops the train in the *shortest possible distance*.

"(b) *It abolishes shocks and their attending damage to equipment.*"

"(c) *It releases instantaneously.*

"(d) *It can be graduated perfectly.*"

On the other hand, the result obtained by the brakes of auxillary-valve patent in suit as compared *with the old automatic* tried the previous year was, in the words of Mr. Westinghouse (p. 126), that—

"the shocks experienced in the preceding year were *greatly exceeded*; reaching a maximum of 103 inches, as compared "with the maximum of 49 inches in the 1886 trials."

The result, in the words of the official report, was to "*leave the field for improvement as wide open as it was in 1886*" (p. 126).

The result in the direction of securing "*the desired coincidence of action*" was that "the interval of application between the first and last cars of the test train was reduced from *twelve to six seconds*" (p. 125). That is to say, the mechanism of the patent sued on did not gain in the direction of securing "coincidence of action," which was the one thing "desired" after the trial of the old automatic in 1886, *a fraction of a second* over the brakes provided with the old means of venting *to the atmosphere*. Compared with the old automatic *not provided with the quick-action device of the 1879 local-vent patent*, the violence of the shocks was *more than doubled*; and compared with the electrically operated valves *venting to the atmosphere* the former was a complete failure,—the latter a perfect success.

What new result, then, can be justly claimed for this invention? The result which Complainants claim is that *compared with the brakes tried in 1886* it stopped a train in 200 feet instead of in 350. This is extolled in Complainants' brief as a wonderful result, and it is therein ascribed to the venting of air *into the brake-cylinder*. The pertinent fact in this connection is entirely obscured, and a fictitious gain is set up, when in reality there was none at all. The comparison from which this conclusion is drawn was *not* with the old automatic provided with the *existing quick-action means of local-vents in the train-pipe*, but with the old automatic *just as it was constructed for short passenger trains*. To determine the gain in promptness of individual, as well as of serial application, over what had been previously attained, or what could be attained by means then known, the comparison should have been with brakes having local-vents discharging *to the*

atmosphere. By means of these devices, as testified by Mr. H. H. Westinghouse (p. 124) the time required for full application of all the brakes was *six seconds*.

The report of the committee, where it refers to the *shortness of the stop* effected by the brakes of the patent in suit, uses as the standard of comparison *the old automatic brakes tried in 1886*, which contained no provision for acceleration. The report says (p. 128):

"These stops may be considered as phenomenal in their
"shortness, which becomes all the more evident *when we com*
"*pare them with the best results obtained in 1886,*"

and adds that—

"the brilliancy of this record was *completely spoiled* by the
"*fearful shock* given at the rear end, the slidometer moving
"it will be observed, from 70 to 103 inches." (P. 128.)

This result, namely, an apparent advantage over a device *not equipped with the known means of local venting to the atmosphere*, and even this dubious triumph, *completely spoiled* by the fearful shocks, is a good enough basis, in the opinion of Complainants' counsel, for a claim of extraordinary merit for the invention of the patent in suit.

But the very next table in the official report of the Master Car Builders gives the result in *quickness of stopping* obtained by the brakes when provided with discharge valves (operated electrically) *venting to the atmosphere*. We find that under the *same conditions* wherein the brake of the auxiliary-valve patent in suit stopped the train in 200 feet, with "fearful shock," the train equipped with the two local vents stopped it in 139 feet, without shock. And the report adds:

"Now comes the still more astonishing story: In these
"electrical stops *the slidometer never moved*, and this with the
"*same cars, the same leverages, and the same pressures*, the
"only difference being *the time of application.*"

We have, then, presented upon the best authority the practical results attained by discharging the train-pipe to the brake-cylinder when using the brake to make a quick stop. In respect of *bringing the train to a stop* the brakes of the patent were phenomenal in their *quickness when compared with the plain automatic-brakes tried in 1886*, and phenomenal in their *slowness* when compared with the same

brakes provided with the local vents discharging to the atmosphere, which vents had quick-acting (electric) motor devices. As to *quick-ening the serial application* of the brakes, the means of the patent in suit gave *exactly the same result as the atmospheric venting-brakes when operated by the same means* (reduction of train-pipe pressure), and results far inferior to the train equipped with electrically-operated vents. As to *shocks*, the invention of the patent more than doubled the violence of the shocks produced by the *old automatic*, which latter had four times the intensity found to be injurious to cargo and equipment, whereas, with the local-vents, the train was stopped without shock great enough to produce any effect on the registering device.

Plainly, then, the claim that this invention is the "pioneer quick-action brake" rests on nothing at all. The invention did not produce a "quick-action brake," nor did it advance the art one hair's breadth towards that result. The gain in this respect *over the old automatic* was due to getting the air quickly out of the train-pipe, (which, with the means for doing it, *was old*), and not in the slightest degree to the use of the air thus discharged in the brake-cylinder. The experiments, as testified by H. H. Westinghouse, showed that precisely the same result in respect of quick *serial* application was produced whether the train-pipe discharged to the brake-cylinder or to the atmosphere.

From these facts we can determine with absolute certainty the *cause* of "quick-action," as produced in the modern air-brakes. That *cause* is the rapid and uniform reduction of pressure in the *entire length* of the train-pipe. *One* of the agencies through which that cause operates in the Westinghouse brake to produce that result we have already seen in the prior art, to wit: local discharge valves in the train-pipe. We have also seen that another co-operating agent was required in order to produce the result by the action of compressed air alone, namely, a *quick-acting motor* for the discharge-valves—a motor that would act with approximately the promptness of the electric actuating devices. When, and in what form this needed agent was devised by Mr. Westinghouse, will shortly appear.

These trials occurred six months after the application for the patent in suit had been filed, and two months after the patent itself issued. The invention was fully matured, and, indeed, there had been abundant opportunity for improvement. Did it accomplish

"the desired consummation," or even give promise of its accomplishment? Mr H. H. Westinghouse says (p. 127) that:

"The beneficial effect of the use of the *electric valves* was so marked that it apparently *seemed to the committee* to be the *only direction* in which to seek for the desired consummation."

The committee were certainly competent judges; but this belief, according to this witness, was generally shared "by those conversant with the subject. He says (p. 129):

"The improvement in respect to the time of application between the first and last brakes was so great between the 1886 and 1887 trials* that it was *not generally believed by those conversant with the subject who witnessed the tests* that a further change sufficiently great could be made to cause the quick-action apparatus to come within the prescribed requirements without the aid of electricity."

The judgment of all who witnessed these thorough trials of the brake of the patent in suit was not only that it did not accomplish quick-action, but that quick-action *could not be accomplished without electricity*. This was the point that was reached when the invention of the patent in suit was fully tested.

THE UTILITY OF THE INVENTION OF THE PATENT IN SUIT.

In demonstrating, as we think has been done, that discharging the train-pipe into the brake-cylinder is not the *cause* of which "quick-action" is the *effect*, we do not necessarily assert that that operation was without *utility*. On the contrary, it had and has utility, as may reasonably be inferred from the fact that it is found in the successful brakes of both the parties to this suit. The utility of this "modification" is said by Mr. H. H. Westinghouse (p. 124) to be, *first*, that it *saved and utilized* air that was *wasted* when the train-pipe was discharged to the atmosphere; and, *second*, that the pressure obtained from the train-pipe for emergency purposes augmented that from

*The change by which this supposed ultimate improvement was effected consisted in putting into use the invention of the 1879 local-vent patent.

the auxiliary-reservoir about twenty per cent.* The first consideration (saving *air*) is paltry in connection with an operation resorted to but rarely, and then only to save lives and property from destruction. The second consideration is more important, as it permitted the braking-power obtained from the auxiliary-reservoir to be *restricted* to that found most suitable for "service"-stops, supplementing that power by the air discharged from the train-pipe in making "emergency"-stops (H. H. Westinghouse, p. 124).

The tests showed that there was no *need* of augmenting the power of the reservoir for this purpose, but the "modification" described by the patent in suit had the advantage that it rendered it *unnecessary* to make provision for such a rapid flow of air from the auxiliary-reservoir as would otherwise be desirable in making an "emergency"-stop. This expedient, then, of directing the air discharged from the train-pipe into the brake-cylinder solved no problem, supplied no necessity, removed no hindrance that stood in the way of "quick-action." It enabled something to be done that was *desirable*, and therefore useful, but which was not necessary to "quick-action," and in fact contributed *nothing at all* to that result.

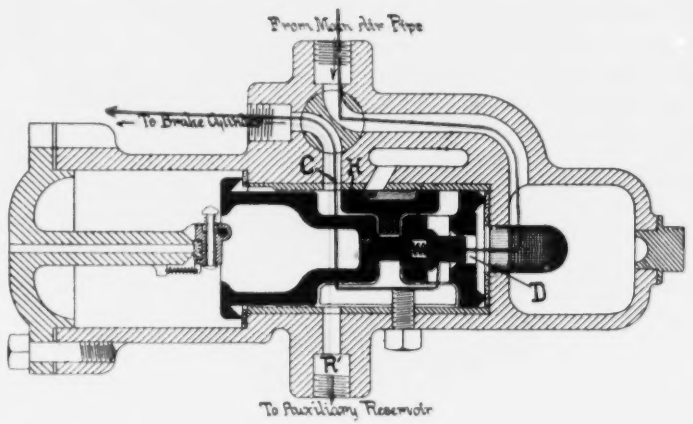
THE BOYDEN 1883 PATENT.

But it is material to ascertain at this point just how far the demonstrated utility of the invention patented in No. 360,070 in suit had been accomplished previously thereto. At this point attention must be given to Boyden's patent of 1883, No. 280,285 (p. 776) and its precise bearing upon the question under consideration, must be determined.

This patent (which we will call the "Boyden 1883 patent") shows that the brake of the auxiliary-valve patent in suit was not the first in which, *when the piston made its complete traverse*, a passage was opened from the train-pipe to the brake-cylinder, so that air could pass directly from the former to the latter.

*The method of exaggeration employed by Complainants' counsel is exemplified by frequent statements to the effect that, by the patented invention, an emergency passage to the brake-cylinder was opened "through which the *train-pipe* air *in bulk* could pour into that cylinder" (p. 17, italics are in the original). According to Mr H. H. Westinghouse the auxiliary reservoir contributes 80 per cent. of the air and the train-pipe but 20 per cent.

Boyden 1883 Patent.



The piston has made its complete traverse, which opens wide the Main Valve through which both Auxiliary Reservoir Air shown by a Yellow line, and air from the Main Air Pipe shown by a Blue line, pass to the Brake Cylinder—just as in the Defend structure.

The construction of this valve mechanism is shown in the accompanying diagram. It may be regarded as in all respects an ordinary triple-valve, and no explanation of any part will be required except with reference to *the passage through the piston from the train-pipe to the valve-chamber*, in which passage is the check-valve D. The operation of this device is such that, whenever the pressure in the train-pipe *exceeds* the pressure in the valve-chamber, air from the former passes through said passage into the latter; *and whenever the main-valve H is open*, the air thus admitted to the valve-chamber, passes freely to the brake-cylinder. Attention is particularly called to these conditions because they are *precisely those which exist in the Defendants' "quick-action brake."*

Since check-valve D always prevents back flow from the valve-chamber to the train-pipe, the passage in which it is placed is said in the patent to be "always open one way only." This condition is also *exactly duplicated* in Defendants' quick-action brake, so that anything in these respects which differentiates the brake of the "auxiliary-valve" patent in suit, No. 360,070, from the Boyden 1883 patent, equally well differentiates Defendants' quick-action brake from the brake of the patent in suit.

It will further be noted that the passage from the train-pipe to the brake-cylinder is opened when, and only when, the piston has made its extreme movement, moving valve H to such position as to uncover fully passage C leading to the brake-cylinder; in other words, *opening the main-valve*. In this, too, there is perfect coincidence between this Boyden 1883 patent and Defendants' "quick-action brake."

There is no pretense by Boyden that, when he invented and patented this brake, he had any idea of thereby quickening the action of the brake. Doubtless, in the use which is now made in great emergencies of the air admitted directly from the train-pipe to the brake-cylinder, there is *greater utility* in opening a direct passage between these points than in any use which Boyden had in mind in 1883. But he *was the first to open that passage when the piston made its final traverse*, and he is entitled to all the benefits and utilities thereof.* He

* Roberts vs. Ryer, 91 U. S., 157; Potts vs. Creager, 155 U. S., 606.

did it in 1883 without an auxiliary-valve, and he does it now without an auxiliary-valve.

Whatever of merit, therefore, there may be in *opening a passage through the triple-valve from the train-pipe to the brake-cylinder by the final movement of the piston*, that operation was performed in the brake of the Boyden 1883 patent. The argument of Complainants' counsel in this connection is plainly based on an unwarranted and false assumption, viz., that the discharge of the train-pipe *into the brake-cylinder* is the *cause* of quick-action, thus arguing from the assumption that Westinghouse used this old operation to produce a new *effect*, and is entitled to monopolize the operation for *that* purpose. Having shown that the assumed relation of cause and effect *does not exist*, the argument is left without support.

The distinction between this Boyden 1883 patent and that of the auxiliary-valve patent in suit upon which Complainants' counsel mainly insist is that this Boyden 1883 patent is a "non-quick-action brake," and that Boyden did not by that invention discharge air directly from the train-pipe to the brake-cylinder "*to produce quick-action.*" The sufficient answers are that the public official trials in 1887 of the brake of the patent in suit conclusively proved that it was equally a "non-quick-action brake," and that if Westinghouse did in fact discharge the train-pipe into the brake-cylinder "*to produce quick-action,*" (*i. e.* with the expectation that he would thereby produce quick-action) the *purpose* for which a thing is done does not confer novelty upon that thing if it be otherwise old,* particularly if it *failed to accomplish that purpose.*

A fact in this case which largely bears the weight of the charge of infringement is that, in Defendants' "quick-action" brake, the movement of the piston *has something to do with* the admission of air directly from the train-pipe to the brake-cylinder. It will, therefore, be very important to note that the piston in the Boyden 1883 patent has *precisely the same agency in this final result as it has in the Defendants' quick-action brake.* In both its exact contribution to that result is *to unseat the main-valve.*

*Walker on Pats., 3d Ed., p. 182; Crescent Brewing Co. v. Gottfried, 127 U. S., 168.

Finally, it is to be noted that the inherent capacity and law of action of this 1883 device is to admit air directly from the train-pipe to the brake-cylinder whenever a lower pressure exists on the valve-chamber side of the piston than on the train-pipe side thereof and the main-valve is open. What Boyden did to produce his quick-action brake was to provide means whereby this difference of pressure can be momentarily created *at the time when it is desired to effect a quick-stop*. Westinghouse invented no such "means," or agencies for this purpose, or for any purpose.

THE INVENTION OF THE WESTINGHOUSE PATENT

No. 376,837.

Recurring now to the condition of things which existed after the second Burlington trials, as stated by Mr. H. H. Westinghouse, it is clear that what was then needed to make the Westinghouse brake a "quick-action" brake was *a quicker motor device for the discharge-valves of the train-pipe*—something that would produce proximately the effect of the instantaneous electrical-actuating devices. It was conclusively shown by these tests that whether the train-pipe discharged to the atmosphere or to the brake-cylinder was a matter of indifference. One way, equally as well as the other, would accomplish "quick-action," *provided a quick-acting motor could be invented*. That was all that was needed *before the invention of the patent in suit*. It remained *just as much a necessity after the invention of that patent*.

On the production of this *quick-acting motor* for the discharge-valves the great energies and resources controlled by the Complainants were now concentrated "by the direction and under the supervision of George Westinghouse, Jr.," (p. 129.)

The expenses and labors devoted to the solution of this unsolved problem, as described by Mr. H. H. Westinghouse (pp. 130-132), were enormous, occupying the time from the middle of May to the latter part of September, 1887. During that period *"all the resources and employees that could be used were kept at work day and night without cessation*, and the materials for trial each time, involving more than a car-load, were conveyed from Pittsburg to Burlington by express, so that no time might be lost."

The mother, Necessity, was in the throes of labor with a *great invention*. In due course it was brought forth, and it was patented to George Westinghouse, Jr., and became and is the exclusive property of Complainants. There is no pretense that Defendants have employed this invention.

This successful quick-acting motor for the discharge or "auxiliary"-valves, which enabled all the discharge-valves of a fifty-car train to be operated in *two seconds*, without the use of electricity, is the "supplemental-piston" patented in patent No. 376,837, dated January 24, 1888. We shall call it the "supplemental-piston" patent.

It was, therefore, with some justification that the invention of this supplemental-piston patent was hailed as a great invention that overcame great hindrances. It was with some justification that the New York courts held, on the demand of Complainants and on the evidence they produced, that this *later* patent was the "pioneer quick-action brake," was "*the bridge which carried car-builders from failure to success.*" It was, undoubtedly, the patent which produced the agent that was needed to enable the cause of quick-action (local-venting) to produce that *result*.

This view also finds some support in the decisions of this Court. As tersely put in the Barbed Wire Fence case (143 U. S., 283). "*In the law of patents it is the last step that wins.*"

But there is *no* justification here for the assumption that pervades the argument of the other side, and finds expression at numerous points in their brief, to the effect that the invention which accomplished the great result of effecting practically simultaneous application of all the brakes on a train of fifty cars was the invention of the "auxiliary-valve patent in suit."

We have now presented the facts with reference to the results produced by the invention of the patent sued on, and we have stated them with great detail, and *solely from the evidence produced by Complainants*, in order to determine, with the nearest possible approach to certainty, just what basis the evidence affords for the claim that the invention of this patent is "the pioneer quick-action brake." We have from these facts to deduce an answer to the question which Complainants have put in issue and made material, and indeed have made the basis of the con-

tention that the patent sued on should be construed broadly for the method or process of discharging air, by the further traverse of the piston, into the brake-cylinder instead of to the atmosphere. That basis is that it was done "to produce quick-action." They are careful not to say that Westinghouse was the first to discharge the train-pipe to the brake-cylinder, *thereby producing* quick-action; but that is what they wish the Court to infer.

Briefly summing up the material facts with reference to the development of the art to the point of the production by Westinghouse of the "quick-action brake," we find that the old automatic in common use had but one discharge opening for the train-pipe, and that if the pipe were the length of fifty cars it required twelve seconds for the air to escape through that one door. Westinghouse had perceived this limitation, and also the way to remove it—namely, by providing a number of doors along the train-pipe, and he had devised means consisting of *supplemental-pistons* for opening these doors, the pistons being operated by the reduction of train-pipe pressure. All this was in the "local-vent" patent of 1879. When this plan came on trial in 1887 it was found that the actuating devices adopted for opening these doors, by reduction of train-pipe pressure (namely, a mechanical connection with the triple-valve piston,) did not work fast enough. It was also found that, if prompt-acting means for opening the doors could be provided, the plan of local venting would be an entire success on a fifty-car train. Mr. Westinghouse thereupon invented and patented in 1888 the "supplemental-piston" as a means for opening these doors. This proved an entire success.

Thus in the actual development of this art, as shown by the testimony offered by Complainants, the auxiliary-valve *operated by the piston of the triple-valve*, has no place at all. After the 1887 tests none of these devices were ever manufactured or put into use. R. p. 149, L. 36.

IS PATENT NO. 360,070 IN SUIT, A PIONEER PATENT?

The answer to this question is read on the face of the facts stated above, but we have to notice the attempt of Complainants' counsel to read a different answer therefrom. This attempt will be disposed of by applying the following principle, which we submit is the law of the discussion on this point:

The earlier and later patents of Westinghouse and the results attained by them, cannot be considered in this case except for the purpose of limiting and defining the scope of the patent in suit, and for that purpose their effect is practically the same as if they were patents of another person.

How important it will be to apply this principle, if it be sound, will presently appear, and the importance of the principle involved justifies our dwelling for a moment upon it.

The principle is that stated and applied in *James v. Campbell* (104 U. S. 356) and is based on the fact that the merit due to inventions of other patents can only be recognized in suits where such other patents are involved. In this instance the patentee can no more borrow credit from the achievements of his other patented inventions for the purpose of inducing the Court to greater liberality in construing the patent in suit, than he can borrow for that purpose from the inventions of others. The patentee stands before this Court, upon this patent, *precisely as if the invention of the supplemental-piston patent, No. 376,837, had been made by another, or had never been made at all.**

Our proposition is that if the patent in suit were a pioneer, it was such *from the moment it was granted*. Its status and its scope were *then definitely and forever fixed*. These could not possibly depend upon what might or might not be subsequently done by the patentee (or by others) in the near future, or in the remote future. Otherwise we commit ourselves to the absurdity of holding that a patent which is not a "pioneer patent" may subsequently become such in consequence of a later invention, itself the subject of a patent.

*Attention is here particularly directed to that part of the main brief of complainants' counsel which begins at p. 30 under the caption, "THE INVENTION OF WESTINGHOUSE OF THE QUICK-ACTION BRAKE IS A 'PIONEER' INVENTION, OR ONE FUNDAMENTAL IN CHARACTER," and extends to p. 38. Underlying all this argument is the assumption that the credit due to the *later* invention, and the result which it brought about, can be considered in support of the patent here in suit, just as if defendants were charged with infringing the later patent.

This is the proposition which the other side offers to the Court to reconcile their claim of pioneership with the facts demonstrated by the Burlington trials. After a slighting reference to the "defects" of the brake of the auxiliary-valve patent in suit, they argue (p. 37) that, notwithstanding the pronounced inadequacy and failure of the patented invention to produce any advance towards "quick-action," the legal consequences are the same as if the invention had completely solved the problem, because these defects were

"shortly remedied by the same inventor, and so promptly and perfectly remedied that at the time the testimony was taken between 1,500 and 1,800 of these valves were in actual use."

But the remedy invented "by the same inventor," and which made his apparatus a "quick-action brake," was patented to him in No. 376,837, and the facts here brought forward were urged upon the New York Courts, and accepted by the latter as establishing that *this later* patent was the "pioneer quick-action brake" patent. Therefore against the assumptions of the foregoing passage we maintain that whether the successful invention "promptly" followed that which failed, or came only after a long interval; or whether it was made "by the same inventor," or by another, or never made at all, are matters which have no influence whatever in determining the scope of the patent in suit. The results achieved by the *later* invention (No. 376,837) confirm and emphasize our position. The ascertained merit that belongs to *it*, for the production of that which was needed to endow the mechanisms existing *before* the invention of the patent in suit with "quick-action" renders it impossible to ascribe to the latter the merit now claimed for it.

The argument of Complainants' counsel which we are now considering would as readily, indeed *much more readily*, demonstrate that No. 217,838, of July 22, 1879, which disclosed "local-venting" of the train-pipe, was the "pioneer quick-action brake patent." The testimony of Mr. H. H. Westinghouse shows that the quick-action means of this patent reduced the time of application from *twelve* seconds to *six*. This is the means which, with the supplemental-piston of No. 376,837, make the modern quick-action Westinghouse brake; and this means is public property. The auxiliary-

valve patent in suit gave no action quicker by a fraction of a second than this. It was merely a lateral excursion from the true line of development of quick-action—a plunge in the wrong direction—failing to give that which was sought, but giving the incidental advantage of economizing air, and supplementing the power of the auxiliary-reservoir, which had already been done in the Boyden 1883 invention.

Between the local-vent patent, No. 217,838, and the supplemental-piston patent, No. 376,837, there may be a legitimate dispute as to the claim of pioneership. The first disclosed the means for rapidly depleting the pressure of the train-pipe, namely local-venting. The latter disclosed what the former lacked, namely practical means for opening the vents with the requisite promptness. One disclosed the principle and *one* of the agents necessary to carry out that principle in practice; the other made the first effective and successful by supplying the *other* needed agent, thus producing a practical embodiment of the invention. But the patent in suit did neither the one nor the other, nor contributed in the slightest degree to either. It has no shadow or color of right to claim pioneership. It is an impostor, with no merit to support its pretensions to pioneership except what it has wrongfully appropriated from other inventions.*

In 1890, Complainants brought suit against the New York Air-Brake Co. for *infringement of the later supplemental-piston patent*, No. 376,837. Here they found a manufacturer of a "quick-action brake" who apparently did not infringe what is, in this suit, Complainants' fundamental, pioneer, quick-action brake patent, which itself is a significant circumstance. Complainants in that suit had to make a judicious distribution of the merit they claim between these two patents, in such proportion that No. 376,837 should get the bulk of it; and they did so. The deposition of H. H. Westinghouse, from which we have freely quoted, was given in the New York case, and

*Opposing counsel refer in their brief to the Bell Telephone and the Mergenthaler Linotype in illustration of the principle that a great and primary invention need not appear in the patent in a perfected form. It is, however, requisite that the means disclosed by the patent should be *fully adequate to accomplish the intended result*. The difficulty with No. 360,070 in suit was not that the apparatus described was "crude," it was anything but crude. The difficulty was that it lacked, *just what the local-vent 1879 patent lacked*, means for promptly opening the vents through which the air could escape from the train-pipe.

from that and all the evidence, the Court was convinced, and so adjudged, that the later patent disclosed the meritorious, primary invention that resulted in the "quick-action brake," and was the pioneer patent. The Circuit Court of Appeals (by Judge Shipman) said:

"The patentee was a pioneer in that he designed in No. 376,837 a new way to accomplish a desired result, but upon the same general idea that he had *unsuccessfully* tried to work out in the earlier patent. His *later patent was the BRIDGE, and not a mere step, which carried car-builders from failure to success.*" (63 F. R. 969.)

Afterwards the Defendants in New York changed their construction and were sued under No. 360,070, the auxiliary-valve patent in suit. Then a redistribution of the merit became necessary, and Complainants were equal to it. But the Court having held that No. 376,837 was the *whole bridge*, could not ignore that conclusion, and hence in the last decision, Judge Lacombe, referring to the previous adjudications, says:

"In these opinions it is held that the two patents, 360,070 and 376,837, disclosed one the emergency-valve, the other the supplemental-piston or special motor, which so far as the art has now progressed, appear to be *both essential* to the *structure* of a successful quick-action brake.* Both these inventions achieved great necessities and overcame great hindrances; each is an *INDISPENSABLE* part of the bridge which carried car-builders from failure to success." (65 F. R. 100.)

In the present suit it is necessary to put forward the earlier auxiliary-valve patent No. 360,070, as *the bridge*, the supplemental-piston patent being introduced casually in the brief as "a subsequent and in some respects *less important* invention of Westinghouse," (p. 33); and the merit is *again* redistributed, going this time in bulk to No. 360,070, in suit.

*Judge Lacombe evidently was not aware of the construction of the Boyden Brake, which employs neither an emergency or auxiliary-valve nor a supplemental-piston or special motor. Since Boyden admittedly does not use the latter it is manifest that he produces the same result (quick action) by means different from those of Westinghouse, for he at least omits what in the latter cannot be dispensed with.

Complainants have thus, at different stages of their litigation, assumed three different positions upon this question of pioneership. First they convinced the Circuit Court of Appeals (Second Circ.) that No. 376,837 was the genuine pioneer. This "*later patent*" they held was "*the bridge on which car-builders crossed from failure to success.*" Afterwards they secured judicial sanction to the proposition that "*each was an indispensable part of the bridge.*"

Either of these propositions would be fatal to the pretensions here, for they cannot charge that Defendants have used the invention of the later patent, which was first the *whole bridge*, and afterwards an *indispensable* part of it. Acceptance of either of these propositions would carry us at once to the conclusion (which by patience will be reached with certainty) that Mr. Boyden crossed *on a bridge of his own*, using what was public property to carry him as far as it would go, and adding, by his own inventive genius, what was required to complete it.

In this suit then, Complainants take their third position, which is that the auxiliary-valve patent in suit is the *genuine* pioneer, the *real* bridge, and that No. 376,837 is neither *the bridge* nor an *indispensable* part of it, but merely a matter of decoration or architectural embellishment.

In establishing two of these contentions, Complainants have succeeded. If they succeed in establishing the third, it will be one of the most remarkable results ever attained by legal ingenuity.

We feel justified in concluding from the foregoing that the auxiliary-valve patent in suit, No. 360,070, is *not* the pioneer patent for "*the quick-action brake.*"

If, then, the broad interpretation which Complainants ask of the patent in suit depends upon the benefit of a rule of interpretation applicable solely to "*pioneer patents,*" the question propounded by the Court is already answered.

But it may be said that, conceding this invention to be not of "*primary*" character, and that it failed completely to accomplish that for which it was solely designed, nevertheless the novel means it disclosed and which produced a result of *some* practical utility may afford the basis for a claim to a process or method, or to some broad means, which claim may be infringed by Defendants. This question will

therefore be considered independently of the question of pioneership, but with reference to the terms of the patent and to the prior art.

CAN PATENT NO. 360,070 IN SUIT BE SUSTAINED AS TO PROCESS OR METHOD?

The effort is to construe Claim 2 as for a process or method of admitting air directly from the train-pipe to the brake-cylinder when that operation is in some manner brought about by the further traverse of the piston. The operation is itself old, but the contention is that it is new to do it by the particular means specified, to wit, by the further traverse of the piston.

The claim is as follows:

"2. In a brake-mechanism the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder and a triple-valve having a piston whose preliminary traverse admits air from the auxiliary-reservoir to the brake-cylinder, and which by a further traverse admits air directly from the main air-pipe to the brake-cylinder, substantially as described."

The proposition that a process, which consists in doing a certain thing (itself old) by a particular means or agency, is patentable under the law, has been frequently passed upon by this Court. Thus in *Corning vs. Burden* (15 How., 252), the claim was for "the preparing of the puddlers' balls * * * by causing them to pass between a revolving cylinder and a curved segmental trough adapted thereto."

The claim was in form for a process performed by particular agents, and the Circuit Court held that it was for "a new process of converting puddlers' balls into blooms." But this Court held that the novelty of the invention resided in the *mechanism* employed."

In *Crescent Brewing Co. vs. Gottfried* (127 U. S., 168), the claim was for—

"the application of heated air under blast to the interior of casks *by means* substantially as described and for the purpose set forth."

The Court held that this was "a claim for *mechanism* and not a claim for a process." And the Court distinguished from *Lawther*

vs. Hamilton, showing that the latter gives no countenance to claiming as a process the doing of a particular thing by a particular agent.

In each of the foregoing cases the agent specified in the claim was in fact that *which performed the particular operation claimed as a process*. Claim 2 of the patent here sued on is peculiar in that the operation attributed to the further traverse of the piston is not performed by that device at all, but by an auxiliary-valve and conduit.

If Westinghouse had, in fact, invented a new means for admitting air direct from the train-pipe to the brake-cylinder (this operation being itself old), and such means were the *piston*, he could undoubtedly have a patent broadly for those means; but even then he could not have a patent for the process of doing it *by means of the piston*.

An attempt is made in this claim to go beyond everything of which the reports give an account, and to claim the admission of air direct from the train-pipe, whenever the further traverse of the piston *plays a part* (however remote) in *actuating the real air-admitting devices*. This interpretation, by *ignoring and excluding* the real means by which the train-pipe air is admitted to the brake-cylinder, makes it *impossible to apply to the claim the uniform test for infringement*—the test which is applicable to patents of all grades, and was applied, for example, in *Morley Machine Co. vs. Lancaster (infra)* that test being, in the language of that decision, that “*each mechanism, individually considered, is a proper equivalent for the corresponding mechanism in the Morley patent.*”

In other words, the test sanctioned and uniformly applied by this Court requires us to find in Defendants' machine the “proper equivalent” of the “corresponding” air-admitting devices of the patent in suit. The interpretation of Claim 2 now under consideration says we shall do nothing of the sort, but shall adopt a new test, namely, whether in Defendants' machine some *one* of a train of mechanisms which *actuates* the air-admitting means, corresponds with a selected *one* of a train of actuating agents in the patent sued on.

We do not think the Court will accept this novel substitute for the settled rule of infringement; but if it did, the patent could not live under it, for this test would prove identity between Complainants' patent and the Boyden 1883 patent, in which the final traverse of the

piston has exactly as much to do with the admission of air from train-pipe to brake-cylinder as it has in Defendants' brake.

We could with equal propriety take for our test of identity the question whether, in the two cases, the engineer's valve has anything to do with the discharge of the air as specified, and argue that resemblance in such points establishes identity.

THE VICE IN CLAIM 2.

It is impossible for the mind to dwell long upon the terms of this claim without the conviction that there is *something* wrong with it, and that this entire litigation, with all its deplorable consequences, is directly due to the presence in the patent of a claim about the meaning of which it is possible to wage such tedious controversy, and which this Court is unable to interpret to its satisfaction after all the argument, explanation and illustration that have been lavished upon it. This in itself shows that the claim is not *specific* and *distinct*, as the law requires.

Can we not locate and identify the cause of this extraordinary difficulty? At least we will endeavor to aid the Court by offering the result of our efforts in this direction.

When the statute requires that a patentee shall "*specifically point out, and distinctly claim*" the novel means whereby he accomplishes his result, it calls upon him to state the *immediate or proximate cause* of the described effect, and the law is not satisfied by a statement of a *remote* cause. Even when the invention is of such breadth that it can be expressed in a general phrase, such as "feeding devices," "spacing means," or "sewing mechanism," * the general term specifies *that agent which DIRECTLY performs the indicated operation*—that is, the means which do the feeding, the means which do the spacing, and the means which do the sewing. A claim so expressed, though of the most extreme breadth, distinctly points out the *necessary elements* to be compared with other machines, in which the presence or absence of "*corresponding*" devices for feeding, spacing, and sewing, operating in the same way and performing respectively the same result, determines infringement or non-infringement.

* *Morley Machine Co. vs. Lancaster*, 129 U. S. 273.

Had Bell claimed transmitting articulate sounds *by means of electricity*, his claim would have been void, notwithstanding that he was *the first to accomplish this result by this means*, because he would then have specified the *remote* cause, and not the *proximate* cause. His claim was sustained because he specified his direct means, to wit, "an undulatory current corresponding in form to the sound waves."

Claim 2 of the patent in suit is vicious in that it ignores *the means which admit air directly from the train-pipe to the brake-cylinder*, and instead recites a movement of the piston which more or less remotely *assists in actuating* the air-admitting devices. Had the patentee claimed (as he did in other claims) his air-admitting means, as broadly as the state of the art allowed, the question of infringement would present no serious difficulty. But instead of thus doing in claim 2 what the law requires of him, he has confused and well-nigh baffled inquiry by attributing to the *piston* an office, operation, or action which it does not perform.

This explanation of the extraordinary difficulty which the construction of this claim has given to all the courts that have attempted to construe it*, and to all the counsel who have attempted to elucidate it, will more strongly commend itself to this Court when we come to compare the invention of the patent with Defendants' brake.

We therefore submit that the patent cannot be sustained "as to process or method" first, because the nature of the invention—of the result accomplished, and of the means that are employed therein—do not admit of interpreting the patent as for that process or method which is sought to be based on claim 2.

THE TERMS OF THE PATENT IN SUIT.

But the "terms of the patent," including the terms of this claim, equally preclude such interpretation of the invention, particularly with the light afforded by the proceedings in the Patent Office, and by the prior art. The patent expressly defines the extent of the novelty as consisting of certain "additional members," and specifies these additional members as the by-passage and auxiliary-valve. The specification nowhere hints or suggests that the inventor has discov-

*Judge Morris construed it as for a function, Judge Lacombe as including the auxiliary-valve, and Judge Hughes as "fatally defective" because lacking the essential elements.

ered a new sort of *piston*, whose novelty consists in that by one movement it admits air from one source and by another movement admits air from another source. There is no new sort of piston described, but *per contra* that member, in the minutest detail of its construction, is *identical with the pistons of the prior art*. The piston and its relation to the auxiliary-valve are correctly described, the former being presented as *one of a series of agencies through which the auxiliary-valve is actuated*.†

This accords perfectly with the known history of the invention. When Mr. Westinghouse sought to quicken the action of his old automatic-brake, he took that apparatus just as it is described in expired patent No. 220,556 (the old automatic triple-valve), and *added to it*—not a *new piston*, or a piston endowed with new characteristics, powers or functions—but a *new valve and a new conduit leading from the train-pipe to the brake-cylinder*. When we seek the novel means with a view to giving the inventor *those means and everything that is the equivalent thereof*, shall we not look to *what he added to the old structure*? Or shall we look to what was there before, and remains without a shadow of change in structure or function? In the case before us, whether we add the *new members*, or take them away, it works no change in the *piston*. The latter, in either case, makes its preliminary and further traverse, and the further traverse in either case displaces the old stem 36 and does nothing more.

We may now clearly see the *non-sequitur* involved in Complainants' argument. The office of the piston always has been to operate the valves of the triple-valve mechanism. If every time a new valve is added and mechanically operated by the piston it can be said that the piston performs a *new operation*, namely, *the operation performed by that new valve*, for precisely the same reason it can be said that the variation of train-pipe pressure performs that new operation, or that the engineer's valve performs that operation. Thus by adding a new port and valve to the triple-valve we have the foundation for saying that each one of these agents "performs a new operation," and we have as many *new processes* as there are agents in the series.

† To support the conclusion here stated we refer the Court to the specification of the patent itself which we have printed in colors at the end of this brief, with an analysis of its contents.

On the contrary, we submit the fact is as clear in respect of the piston as of each of the other old agents, that it performs no new function or operation at all, and that the agent of the new operation is that which was added to the old structure for the express purpose of performing it.

THE PROCEEDINGS IN THE PATENT OFFICE.

The meaning of the terms of the patent is, we think, unmistakable; but additional confirmation, if it be needed, will be found in the file-wrapper of the application (p. 706 *et seq.*).

Original Claim 1 (p. 714) was for the ordinary brake elements combined "with a *device* for admitting air directly from the main air-pipe to the brake-cylinder." This was rejected on Boyden's 1883 patent, cancelled, and present Claim 1 substituted (p. 717). This claim reads:

"1. In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder, a triple valve, "and an auxiliary-valve device, *actuated by* the piston of the "triple-valve, *and independent of the main-valve* thereof, for "admitting air in the application of the brake, directly from "the main air-pipe to the brake-cylinder, substantially as "set forth."

By the differentiations between the cancelled and substituted claims, attention was directed specially to the salient features of novelty as being the *addition* to the triple-valve of "an auxiliary-valve device," "*independent of the main-valve,*" and "*actuated by* the piston."

When confronted with Boyden's patent, Mr. Westinghouse did not say, as his counsel now say, "my invention consists in a piston which is new in that it does something which the piston of a triple-valve never did before," but on the contrary he specifies with great precision his novel means for admitting air from the train-pipe, to wit, an auxiliary-valve device independent of the main-valve, and he specifies the true relation between these means and the piston, saying that the auxiliary-valve is "*actuated by* the piston." The piston then is not the new air-admitting means, but is merely the actuating device for the air-admitting means.

Claim 2 had also been rejected on Boyden's patent, and the inventor was called upon to point out an essential and patentable distinction. We quote this claim again :

" 2. In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, and a triple-valve having a piston
 " whose preliminary traverse admits air from the auxiliary-
 " reservoir to the brake-cylinder, and which by a further
 " traverse admits air directly from the main air-pipe to the
 " brake-cylinder, substantially as set forth."

Having put before the examiner a claim (new claim 1) in which the novel air-admitting means (the auxiliary-valve independent of the main-valve) conspicuously appeared, so that it was prominent in the examiner's mind, the inventor proceeds to argue upon both claims ; and in discussing *Claim 2* says :

" When, however, the triple-valve is *provided with an auxiliary-valve operated by its piston*, which performs a new function *additional to that of the triple-valve as previously employed*, " it is believed that *such combination* is wholly novel."

This virtually says to the office and to the public, " my claim extends to the use, additional to the triple-valve as previously employed, of an *auxiliary-valve*, operated by the piston. Outside of those limits every one is free from every assertion of claim under this patent."

Upon this construction of the claim the patent was granted to him, and under well-settled principles this precludes the patentee from asserting, and the Court from adjudging, that this claim covers the *process* of admitting air directly from the train-pipe to the brake-cylinder by a further traverse of the piston.

Sheppard vs. Corrigan, 116 U. S. 593.

Sutter vs. Robinson, 119 U. S. 530.

Roemer vs. Poddio, 132 U. S. 317.

Crawford vs. Heysinger, 123 U. S. 589.

Corbin Lock Co. vs. Eagl Lock Co., 150 U. S. 38.

Before the grant of the patent, moreover, the inventor inserted the following disclaimer (p. 720) : *

* See paragraph printed in green ink on folder at end of brief.

"I am aware that a construction in which 'an always open "one way" passage from the main air-pipe to the brake-cylinder is *uncovered* BY THE PISTON OF THE TRIPLE-VALVE "SIMULTANEOUSLY WITH THE OPENING OF THE PASSAGE FROM "THE AUXILIARY-RESERVOIR TO THE BRAKE-CYLINDER, has been "heretofore proposed, and such construction, *which involves "an operation different from my invention*, I hereby disclaim."

This effectually disclaims, not only the Boyden brake of 1883, but Defendants' quick-action brake, and particularly *that office of the piston of the latter which is now pointed to as constituting identity of Defendants' brake with the subject-matter of claim 2*. Defendants' brake, as we will presently see, admits air directly from the train-pipe to the brake-cylinder by the same "always-open-one-way passage," which is "*uncovered by the piston of the triple-valve simultaneously with the opening of the passage from the auxiliary-reservoir to the brake-cylinder,*" and the piston in Defendants' brake does nothing more than or different from this.

What complainants' counsel have contended for in this case is that a construction, in which a "passage from the main air-pipe to the brake-cylinder is uncovered by the piston of the triple-valve simultaneously with the opening of the passage from the auxiliary-reservoir to the brake-cylinder," is identical with the invention of the patent in suit. The patentee himself says in his specification that such construction is old (as it is), that it involves "an operation *different from*" his invention, and that he *disclaims it*.

THE PATENT CANNOT BE SUSTAINED AS TO PROCESS OR METHOD IN VIEW OF THE PRIOR ART.

Discharging the train-pipe to quicken the successive application of the brakes was not new, (Westinghouse 1879 local-vent patent). Discharging the train-pipe to the brake-cylinder simultaneously with the admission thereto of air from the auxiliary-reservoir was not new, (Boyden's 1883 patent). These are the only operations involved which could conceivably be processes. Neither is claimed. Effecting the discharge of the train-pipe by the movement of the piston is excluded from the patent, the modification which

claim 2 includes being that in which the end of the train-pipe discharge passage connects with the brake-cylinder. This is purely a matter of structure. Discharging the train-pipe to the brake-cylinder "*to produce quick-action,*" defines an operation with reference solely to the object sought thereby. This qualification would not confer novelty on an old operation, even if the stated object had been attained thereby, which was not the case.

The interpretation which this patentee himself put upon the prior art in preparing and prosecuting his application for the patent in suit, is specially significant because of his peculiar and accurate knowledge of that art. Being thoroughly conversant with that art particularly as developed by his own previous inventions, he made no pretense of any novelty in process or method, or in the operation of the piston, but set forth his invention as consisting simply of certain specific mechanism, whereby the old operation of locally discharging the train-pipe, and the other old operation of admitting air from the train-pipe to the brake-cylinder simultaneously with air from the auxiliary-reservoir when the piston made its full movement, were effected. The peculiar language of claim 2 offers no contradiction to this, for the attorney who drew it construed it to the Patent Office as a "combination" of the old triple-valve with "an *auxiliary-valve,*" operated by the piston, the latter thus preforming an additional office, that is, opening another valve *additional* to those of the triple-valve, as previously employed.

The specification sharply draws the line between his previous inventions and the new "structural features" disclosed by the patent in suit; but not being so familiar with the inventions of others, the patentee evidently thought he was entitled to claim the combination with the old brake elements of *any* "device for admitting air directly from the main air-pipe to the brake-cylinder" (original claim 1). When, however, attention was called to the Boyden 1883 patent, Westinghouse promptly struck out this claim and expressly stated that his new means consisted in an "auxiliary-valve," and specifically in one that was "*independent of the main-valve.*"

No suggestion that he invented in 1886 a new process or method, or any new operation of the old piston, nor anything capable of bearing that interpretation, ever proceeded from this patentee or

from those who represented him, until such a contention became necessary to support the charge of infringement in this case.

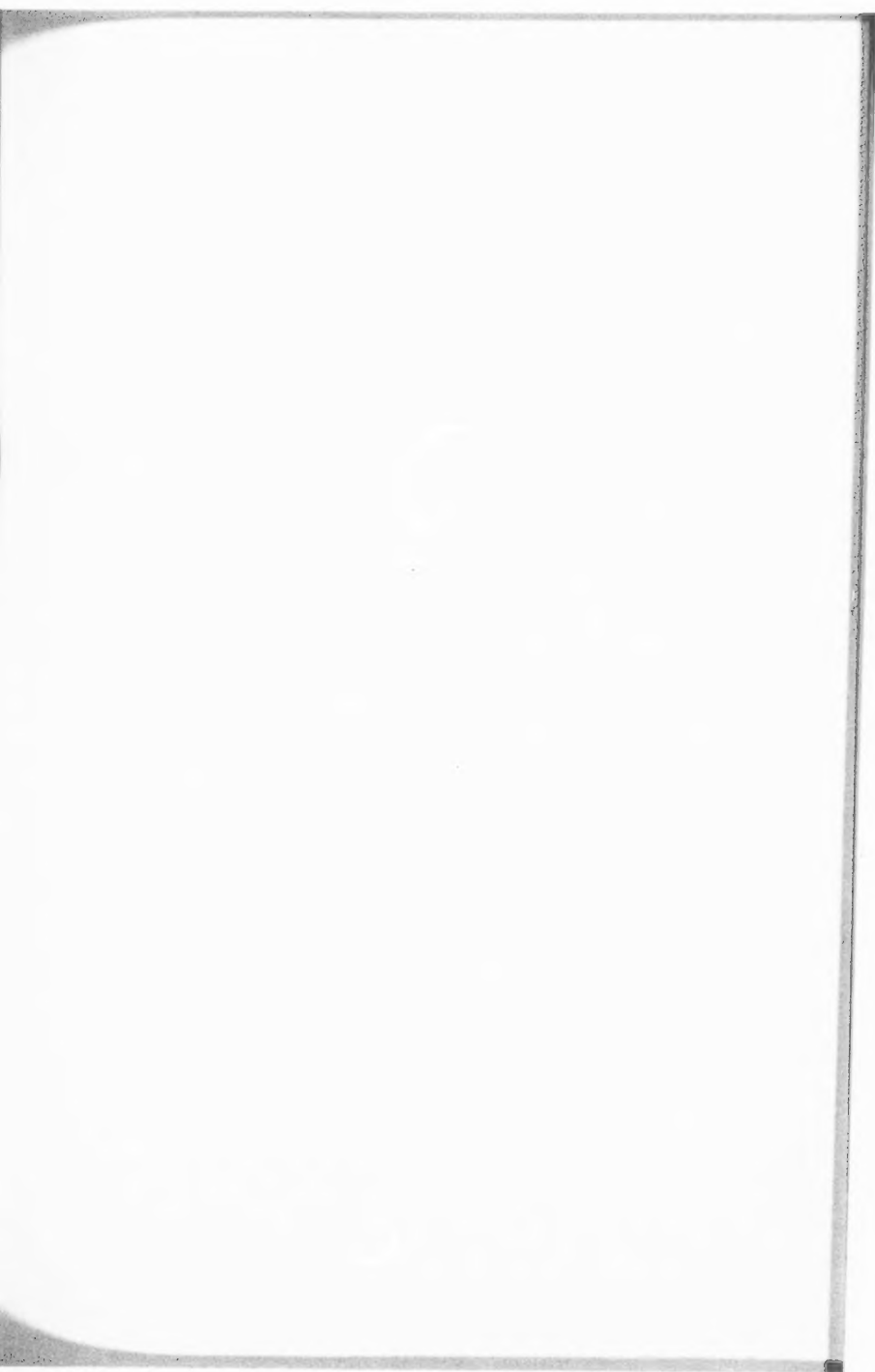
Because then of the state of the prior art, because of its own terms, and because of the proceedings in the Patent Office, the patent sued on cannot be sustained as to process or method.

To these reasons we will add another which will be briefly discussed hereafter, namely, that the patent cannot be sustained as to process or method under the settled law of this Court.

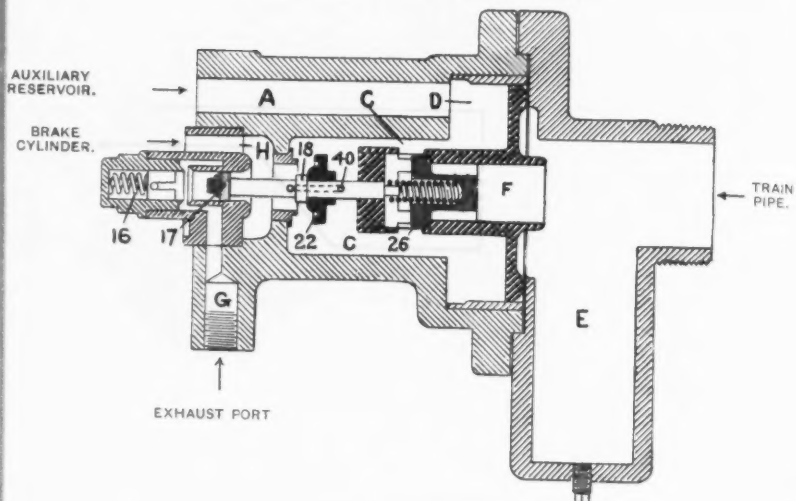
INFRINGEMENT.—DEFENDANTS' STRUCTURE.

We have seen how Westinghouse converted the automatic brake of expired patent No. 220,556 (the old automatic triple-valve) into a quick-action brake by adding to it the means for quickly depleting the train-pipe disclosed in expired patent No. 217,838, (*i. e.*, discharging the train-pipe under each car); and that the modern Westinghouse quick-action brakes, in their broad features, comprise a combination of the devices of these two patents. We have seen that, in bringing these two things together, Westinghouse first attempted to find their practical embodiment by *adding* to the mechanism of the old triple-valve of No. 220,556, an auxiliary-valve, and leading the passage controlled thereby to the brake-cylinder, operating this valve by the further traverse of the piston; that the second Burlington tests demonstrated that this invention did not supply the one thing needed, to wit, a quick-acting motor device for actuating the discharge (auxiliary) valves; that thereafter Westinghouse abandoned the use of the piston of the triple-valve as an actuating device for the discharge-valves, and substituted a new motor device, to wit, a *supplemental*-piston, which was patented to him in a later patent, No. 376,837.

We have now to show, as a matter of fact and history, how Mr. Boyden, starting also from devices existing previously to the invention of the patent sued on, developed a "quick-action brake" by means of an invention which made it *unnecessary* for him to invent or to employ, either an auxiliary-valve operated by the piston, as unsuccessfully attempted in the patent sued on, or a supplemental quick-acting motor for the auxiliary-valve, as successfully done in

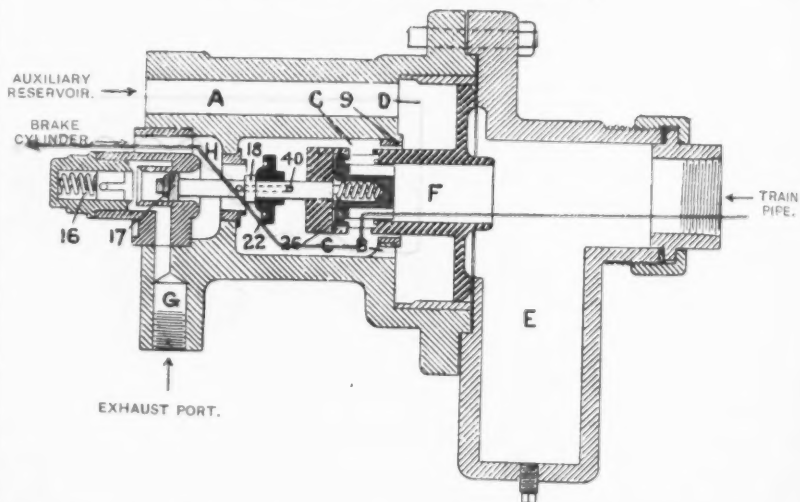


**The Old Poppet Form of Triple Valve 1873
incapable of Quick Action.**



Defendants Structure.

**The Old Poppet Form of Triple Valve, made capable of Quick Action
by inserting Boyden's Partition 9.**



In the upper cut the structure operates as a plain Triple Valve, the Main Valve 22 admitting only Auxiliary Reservoir Air to the Brake Cylinder as shown by the Yellow line, & in the lower cut the structure operates as a Quick-Action Valve. The Main Valve 22 admitting both Auxiliary Reservoir and Train Pipe Air to the Brake Cylinder as shown by the Yellow and Blue lines.

This great transformation in the operation being due to inserting the partition 9. With it, the Defendants Structure is a perfect quick-action device without employing any additional or "Auxiliary Valves" in any form, or their mechanical equivalents.

No. 376,837, or any equivalent for either of these devices, both of which are "*indispensable parts*" of the Westinghouse quick-action brake. This invention of Mr. Boyden develops latent but inherent capacities in the old triple-valve brake mechanisms, *leaving every moving part thereof exactly as it was before the patent in suit.*

What Mr. Boyden added to the old and common triple-valve mechanism was a stationary partition, separating the triple-valve chamber from the piston-chamber, this partition having through it an always-open passage of small cross-sectional area.

This simple structural change, *which added no new moving part, and altered no old moving part*, introduced into the old triple-valve a *new mode of operation, which we will now explain.*

The annexed cuts show the construction of Defendants' brake, and we will first briefly point out those parts which correspond in construction and operation with the old triple-valve mechanism (upper cut).

The feed-in valve 26, colored blue, is of the check-valve form, covering an opening through the piston to the valve-chamber. This form of valve is shown in Westinghouse patent No. 144,006 (p. 740), as well as in the Boyden 1883 patent. The main-valve 22 (black) is of the poppet form, and the release-valve 17 (green) is carried on the prolongation of the piston stem, the mechanism being in respect of these two valves like the Westinghouse patent, No. 141,685 (p. 736). The main-valve is provided with the sensitive-graduating valve (yellow) in the form of a passage in the sliding stem.

As thus constructed the apparatus operates in all respects like the old automatic triple-valve 220,556; that is to say, on a partial traverse of the piston the release-valve is closed, and the graduating member of the main-valve moves to a position which admits air gradually from the valve-chamber to the brake-cylinder through the main-valve port. Successive slight variations of pressure in the train-pipe admit additional volumes of compressed air as desired. On the further traverse of the piston the main-valve 22 is raised from its seat, opening more widely the main-valve port and admitting a greater volume of air from the valve-chamber to the brake-cylinder. Thus far the operation is identical with the old automatic triple-valve patent No. 220,556. The valve-chamber is, of course, con-

stantly replenished from the auxiliary-reservoir, with which it has free communication.

The new departure in structure which the lower cut exhibits consists in the presence of a partition or stationary diaphragm, 9, which separates the valve-chamber from the piston-chamber, communication between the two, however, being always maintained through the small passage B. This departure may be accurately described as a contraction in the valve-chamber, leaving a free but contracted channel of communication to it from the piston-chamber.

Close attention is now asked to what new thing happens by reason of the presence of this partition or contraction.

In making "service"-stops the devices operate exactly as before, and with the same results, air passing from the valve-chamber to the brake-cylinder through the main-valve port by reason of the movement of the graduating (yellow) valve.

In making "emergency" stops, the piston makes its further traverse as before, the main-valve 22 is unseated as before, and air passes more freely from the valve-chamber to the brake-cylinder, as before. There is no new operation of any sort, certainly *no new operation of the piston*. But auxiliary-reservoir air cannot now *get into* the valve chamber so freely as it did before, because the passage from the auxiliary-reservoir has been *contracted* by partition 9. Still there is no new operation of any part. The effect is that the pressure in the valve-chamber suddenly falls to, say, about five pounds. Consequently the feed-in-valve opens and admits air from the train-pipe to the valve-chamber. This is what this form of feed-valve always did when these conditions existed. There is no new operation here.

The *new* thing that Boyden has done is to cause this old operation of the feed-in-valve, with the old effect of admitting air from the train-pipe to the *valve-chamber*, to take place *at the time he wanted it to take place*; and this he did by a structural change (inserting a partition 9) of a stationary part of the old triple-valve mechanism, which change is not suggested in the Westinghouse auxiliary-valve patent in suit, nor by anything in the prior art. The conception is in the highest degree original, whereas the means or additional members which Westinghouse employed to produce *his* quick-action brake, to wit, the relief-ports, the

auxiliary-valves therefor, and the supplemental-pistons for operating these valves, are *all* found in the prior art. Only the by-passage leading to the brake-cylinder is new, and if the passage in Defendants' brake *through the valve-chamber* corresponds with that, it is anticipated by the Boyden 1883 patent.

The latter patent gives us, by comparison, the exact measure of the new departure in mechanism or means, and in mode of operation, which the invention of Mr. Boyden introduced. In this old patent we find the feed-in-valve in the same position, operating by the same agency (relative fall of pressure in the valve-chamber) to produce the same effect (admission of air from the train-pipe to the valve-chamber). We also find this operation occurring under the same conditions, that is, when the main-valve is open establishing communication between the valve-chamber and the brake-cylinder, and we find the same effect, namely, a passage opened from both train-pipe and auxiliary-reservoir *through the main-valve port*.

There is absolutely no difference, except the great difference of means for *producing at the desired moment* a relatively great fall of pressure *in the valve-chamber*. This difference of pressure did only what it did before, but the means for producing it is new. This new means is the *agency*, by which Boyden obtained—not a new operation or effect—but an *old* operation at a particular time.

Thus the desired result—"quick-action,"—was attained by means, agencies and operations of which such as *did not exist in the art prior to the patent in suit*, were devised by Boyden himself, and were not suggested in the patent in suit, and have no correspondence with the new means or operations described therein.

The process of causing a fall of pressure on one side of the piston (the train-pipe side) to produce A FAR GREATER FALL OF PRESSURE ON THE OPPOSITE SIDE THEREOF, thereby causing the customary operation of the feed-in valve to produce the customary effect, constitutes the essence of the novelty of the Boyden brake, and between it and the novel means and operation of the patent in suit there is no correspondence whatever. On the contrary, while the vital thing in Defendants' brake is the production of much lower pressure in the valve-chamber than in the train-pipe, it is essential in Complainants' brake that the pressure in the valve-chamber should exceed that in the train-pipe; otherwise it will not operate.

This striking difference in essentials emphasizes the fact that the brake of Defendants appropriates *nothing* from the patent in suit.

VALVE 22 NOT THE AUXILIARY-VALVE OF THE PATENT IN SUIT.

One of the contentions of Complainants has been that the small graduating-valve of the Boyden brake is in reality the main-valve, and that the valve 22 is the "auxiliary"-valve. This theory has been so thoroughly handled, and (as we think) disposed of, in former arguments, that we will give it but brief notice. On this *question of fact* both the lower Courts have found against this contention, and we think this Court will not reverse these concurrent findings.*

The argument of Complainants on this point is that valve 22 is not the main-valve of the old triple-valve, but is an "auxiliary"-valve, because, like the auxiliary-valve 41 of Westinghouse, it opens *only for emergency*, and then like the latter it admits train-pipe-air to the brake-cylinder.

The construction of Defendants' brake in respect of the main-valve and graduating-valve is *exactly* that of claim 1 of the old automatic triple-valve patent No. 220,556 (p. 766), as follows :

"1. In combination with the piston and stem of a triple-valve, a valve, H, arranged on said stem, and having a "short range of motion independent of such stem, in combination with an *auxiliary-* (sensitive graduating) valve "*operated by the same stem to close or open a port through the main-valve, without necessarily moving the main-valve,* "*substantially as set forth.*"

This combination is now *public property*

The unanswerable objections to this contention, briefly stated, are :

(1) That the valve 22 does not open *only* for emergency, nor, when it does open, does it admit train-pipe-air *only*. It will open whenever the pressure in the train-pipe is lowered to the proper degree, regardless of whether the pressure is lowered rapidly enough to open the feed-in-valve and admit

* This Court has repeatedly held that it will not reverse the concurrent findings of two inferior Courts on a question of fact unless the error be clear. *Wiscart vs. Dauchy*, 3 Dall., 321; *Lemmers vs. Nissen*, 154 U. S., 650.

train-pipe-air to the valve-chamber. When it does open it is not to admit train-pipe-air, but *any* air that is in the valve-chamber. In *all cases* it admits air from the auxiliary-reservoir. Conspicuously in the case of breakage of the train-pipe it opens *to the fullest extent without admitting any train-pipe-air at all*.

(2) The valve 22 and its subordinate member, the graduating-valve, act exactly as in the old automatic triple-valve patent No. 220,556, the latter opening for service-stops, the former for emergency-stops.

(3) It is obvious from inspection of the drawing of the Boyden brake, and was conclusively shown by trials at the last argument, that *when partition 9 is removed* the device becomes a plain ordinary triple-valve without quick-action, and the valve 22 is *then* beyond dispute the *main-valve*. If so, it remains the main-valve when the partition is inserted.

(4) The "main"-valve is *always* that valve which controls the passage from the *valve-chamber* to the *brake-cylinder*. This valve has nothing to do with admitting air *to the valve-chamber*. The feed-in-valve always attends to that. Therefore, when the main-valve opens it can only do one thing, namely, admit air from the *valve-chamber* to the brake-cylinder. Hence, valve 22 is the main-valve and not an *auxiliary-valve*.

The identification of valve 22 of Defendants' brake as the "auxiliary"-valve is a necessary part of the theory of infringement which Complainants originally attempted to establish, and which is developed by their expert in their *prima facie* proofs. It is on this theory that infringement of claims 1 and 4 was urged. It appears to us that no further discussion of these claims, or of this theory, will be required by the Court. We expect to satisfy the Court not only that claim 2 is not infringed, but that no claim could be based on the invention of the patent sued on that would cover Defendants' quick-action brake.

THE COINCIDENCES BETWEEN DEFENDANTS' QUICK-ACTION BRAKE AND THAT OF THE PATENT IN SUIT
EXTEND ONLY TO FEATURES THAT WERE OLD.

"*Infringement*" consists in the unauthorized use of the *NOVEL* means described and CLAIMED by the patent sued on. The term "means" does not ignore equivalents, but embraces them, for the equivalent of a thing, in the eye of the law, is "*the same as the thing itself*."*

The conclusion that infringement has not been committed by Defendants in this case follows from the fact, already elucidated, that the essential *new* thing in the brake constructed by the latter, and to which its character as a "quick-action" brake is directly due, is radically different from the *new* features of the patent in suit to which the results it accomplished (which was not "quick-action") were due.

But the examination of the case would not be satisfactory if it did not fully disclose the reasons why, notwithstanding the contrary bearing of the facts, it has been possible to make a respectable showing in support of the contention that infringement has been committed.

We have already shown that this contention has been largely supported by erroneously identifying the discharge of the train-pipe into the *brake-cylinder* as the *cause* of "quick-action," the fact being that the venting of the train-pipe at different points is the *vera causa*, and that the "modification" consisting in connecting these vents with the *brake-cylinders*, though it may have rendered the action of the system as a whole more efficient, was not in any sense the *cause* of "quick-action."

The contention of infringement has been further supported by the fact that between the device of the patent in suit and that of Defendants there are certain coincidences, or points of resemblance. That this fact does not lend the least support to the conclusion urged is fully shown when we have ascertained that the features, in respect of which the two structures resemble each other, were *old*, and that their operation and action have to do with the *ordinary* service of the brake, and not with that *peculiar and special* service which is called "quick-action."

* "Authorities concur that the substantial equivalent of a thing, in the sense of the patent law, is *the same as the thing itself*."

Machine Co. vs. Murphy, 97 U. S. 120.

One method of demonstrating this is to remove from each brake those features to which this peculiar service is due, and to note that *all* the features of *resemblance* between the two remain without change in structure or mode of operation.

Another method is to examine these resemblances in the two structures and to note that they do not reside in the novel features of construction and operation disclosed by the patent in suit. This latter method remains to be applied.

The resemblance to which Complainants' counsel draw the mind of the Court is that in Defendants' brake, as in the patent in suit, the further traverse of the piston preceeds the discharge of the train-pipe into the brake-cylinder, and in both this movement of the piston is one of a train of operations which has for its effect to actuate the means which admit air from the train-pipe to the brake-cylinder. This resemblance admits of use to support the charge of infringement of claim 2, because that claim, as already pointed out, suppresses the air-admitting means and leaves identity to be determined by resemblance in some other particular.

We are therefore to look for identity in the agencies which operate the discharge-valves. If those agencies comprise a series it is manifest that a resemblance in one or more members does not necessarily constitute identity of the series, and that if it be allowable to designate one of these members as *the* actuating device, instead of specifying the entire series, we would be compelled to select that member which is the *primary* agent.

In the present instance this primary agent is plainly the engineer's-valve, and if it be permissible to interpret the patent by this method, claim 2 should clearly read as for the combination with the ordinary automatic brake-mechanism, of an *engineer's-valve* whose "preliminary-traverse admits air from the auxiliary-reservoir to the brake-cylinder, and which by a further traverse admits air directly from the train-pipe to the brake-cylinder." There is as good, or better, justification in the invention for a claim so drawn as for the claim we are discussing, for this is precisely what happens if we indulge the vice (heretofore pointed out in respect of claim 2) of ignoring the proximate or direct cause of the specified effect, and substituting a remote cause. If the claim had been drawn in this way, it would be plainly seen that it was "fatally defective" in not

distinctly pointing out and claiming, as the law requires (section 4888, R. S.), the part, improvement or combination constituting the invention. The reason why the less justifiable designation of the *piston* as the means which admits air from the train-pipe to the brake-cylinder presents a claim in which the vice is more difficult of detection, is simply that a *less remote agent* has been designated as the cause.

Starting, then, with the engineer's-valve, the effect of the specified movements in both the compared cases is, *as in all automatic brakes from the beginning*, to deplete, in different degrees, the pressure in the train-pipe. This then is a point of coincidence between the two series of operations, but it presents nothing new in either. The depletion of pressure, in turn, causes the piston to make either a partial traverse, or a complete traverse, according to the degree of the depletion, and it is this greater or less movement of the piston that claim 2 designates as the agent that admits the train-pipe-air to the brake-cylinder.

These three elements or steps in the operation, to wit (1), the movements of the engineer's-valve, (2) the variation of train-pipe pressure, and (3) the movements of the piston, are common to Complainants' patent to Defendants' structure, *and to the prior art*. We have so far found nothing to distinguish Defendants' mechanism from the mechanism of the patent, *and nothing to distinguish the latter from the prior art*. No new element has yet appeared, nor any step in the operation that has a scintilla of novelty. Selecting the engineer's-valve, or the greater or less depletion of air in the train-pipe produced by the movement of the valve, or the consequent partial and further traverse of the piston, or, taking all three together, would equally fail to specify anything novel in construction and operation. *The novel means for actuating the auxiliary-discharge-valve, described in the patent in suit, lie between the piston and the valve.* The novel means invented and patented by Boyden also lie between the piston and the valve that admits air to the valve-chamber, which in his case was not a new valve. Here, *precisely at the point where the novelty begins, the resemblance ceases*, and this is the reason why no possible interpretation of the patent in suit could be adopted which would embrace what Defendants have done.

In the brake of the patent in suit the piston on its further traverse opens the main-valve and also makes contact with a stem 36, displacing the latter against the pressure of a spring, and this displacement actuates the discharge (auxiliary) valve.

In Defendants' brake the further traverse of the piston opens wide the main-valve, as it did in the prior art, and *it does nothing more*. In the subsequent actions the piston is not an actor or agent. An immediate and great difference in pressure is at once established on opposite sides of the old feed-in-valve. Why? Because the passage from the auxiliary-reservoir to the valve-chamber has been *contracted*, so that the valve-chamber empties through the main-valve faster than it can be replenished from the auxiliary-reservoir. Hence the air from the train-pipe enters the valve-chamber just as it did in the Boyden patent of 1883. But up to this point we have no admission of the train-pipe air to the *brake-cylinder*, we have only *discharged the train-pipe*, using the means of the old art to do it. Entering the valve-chamber the air choses the path leading to the brake-cylinder, rather than that to the auxiliary-reservoir, because it finds the old main-valve open, and the path through it is that of least resistance. So it did, and for the same reason, in the Boyden 1883 patent.

In all this there is not the semblance of utilization of a single element in the means for actuating the auxiliary-valve which was new in the patent in suit.

The conclusion must inevitably be that the brake of Defendants' coincides with that of the auxiliary-valve patent in suit in no feature either of construction or operation that was *new with the latter*. It follows, also, as a corollary, that claim 2 is "fatally defective" if interpreted as excluding the means disclosed in the patent for admitting air from the train-pipe to the brake-cylinder.

A TEST FOR INFRINGEMENT.

If Westinghouse took the old triple-valve mechanism and added something to it, thereby accomplishing quick-action, and Boyden took the same old mechanism, added something to it and thereby accomplished quick-action, the resemblance, to constitute infringement, must be found *in the new or added parts*. Now the novelty in the

parts which Westinghouse added did not reside broadly in a passage or in any "device for admitting air from the train-pipe to the brake-cylinder," which was one thing that he added, for he claimed that in original claim 1 and struck it out in view of Boyden's 1883 patent.

He then limited his claim to a device (auxiliary-valve) for admitting air from train-pipe to brake-cylinder *actuated by the further traverse of piston*. This was his novel addition to the old triple-valve mechanism, so far as the patent in suit (and particularly claim 2 thereof) is concerned.

But that did not produce "quick-action," and so he invented further, and added, by a later patent, a better *actuating motor* for his auxiliary-valve device, leaving the latter unchanged. This improved actuating-motor was the "supplemental"-piston of 376,837.

Boyden, by the addition *he* made to the old structure, produced the same result as that produced by the *two* inventions of Westinghouse. This addition consisted in a partition separating the valve-chamber from the piston-chamber, the partition having a small hole or passage through it.

If then each of these persons has accomplished the *same result* (as is granted), the question remains have they done it *by the same means?*

The answer is that the stationary partition of the Boyden brake is not the same means as the by-passage and auxiliary-valve (of one Westinghouse patent), *plus* the supplemental-piston (of the other Westinghouse patent), because it is not the same in structure or in mode of operation. It is radically different in both respects.

If, however, we found as a fact that the means whereby Boyden produces the result of "quick-action" were the equivalents of the means whereby Westinghouse produced that result, nevertheless *infringement could not be found*, because an essential part of the Westinghouse means is *embraced in a patent not involved in this suit*.

THE REAL INVENTION OF No. 360,070 IN SUIT.

This invention has been put forward by Complainants as the *cause* of "quick-action," *i. e.*, as supplying the means whereby the one thing desired ("*coincidence of application*" of all the brakes) was obtained. We have been largely occupied in showing that the

invention has been presented in a false guise, and necessarily have for the most part ignored the real merit of the invention and the real result it attained.

Had Complainants fairly presented their invention to its best advantage without disguise or false pretenses, it would have appeared in this aspect: that the *result* accomplished by the invention had to do solely with the prompt and forceful *individual* application of the brakes, contributing nothing to the quicker *serial* application thereof, and that the improvement or advantage gained lay in securing the individual application of the brakes in emergency stops without employing a larger auxiliary-reservoir, or a larger passage therefrom to the brake-cylinder, than was required for service stops. This advantage was gained by adding the air discharged from the train pipe in making emergency stops, to that from the reservoir, this formerly wasted air contributing one-sixth of the total pressure. This was the *result* of the invention. The means whereby it was attained consisted of the following modifications of what previously existed: (1) connecting the end of the old discharge-passage of No. 217,838 (the local-vent patent) to the brake cylinder, instead of leading it to the atmosphere; (2) connecting the old discharge-valve with the old stem 36 of No. 220,556 (the old automatic triple-valve) so that the movement of the piston would be communicated to this valve through said stem.

The second modification is of little or no importance. Operating the discharge-valve by the further traverse of the piston had *previously* been done in the arrangement described by Mr. H. H. Westinghouse (p. 124). It is not, by anything that appears in the record, the invention of this patentee, and in any event is excluded from the patent sued on. Moreover, it would appear an obvious expedient, on adding another valve to those ordinarily present in the triple-valve, to connect it with the organ whose customary office is to operate all the valves. Invention would hardly be required until it should appear that the piston was not equal to performing this office for the new valve. *Then* it would become necessary to devise a new motor on account of the refusal of the piston to perform the additional labor of operating another valve. This is exactly what happened, the invention of the "supplemental-piston" of No. 376,837, being achieved at enormous cost and by prodigious effort. Until *its* advent

Westinghouse was as far as ever from quick-action. The field was "as wide open" as in 1886.

By the most liberal view of the invention of the patent in suit, we have in these modifications the basis of the broadest possible claims that could be maintained by the patentee. These modifications present no novelty in *structure* in a broad sense, since a passage from the train-pipe to the brake-cylinder, which opened "simultaneously with the opening of the passage from the auxiliary-reservoir to the brake-cylinder,"* is found in Boyden's 1883 patent. Nor does the qualification that this passage is opened simultaneously with the opening of the main-valve *by the piston of the triple-valve*, confer novelty on the means, because the opening of such passage under such conditions and *by such means* is found in the Boyden 1883 patent and is *expressly disclaimed in the patent in suit*. There remains, then, the qualification of doing this at a particular time, or for a particular purpose, *i. e.* at the time when it is desired to produce a quick stoppage of the train. This qualification itself is not patentable, but the *new* means on which it depends are patentable, and thus we finally arrive at the *means* of the patent, to wit, the auxiliary valve and by-passage, when the valve is combined with the triple-valve piston so as to be mechanically actuated thereby, either directly or through a suitable mechanical connection.†

These means are not anticipated by the Boyden 1883 patent, because, while the final movement of the triple-valve piston therein opens a passage from the train-pipe to the brake-cylinder, thus forestalling any broad claim thereon, it does not do this *by acting upon and unseating an auxiliary-valve*.

For the same reason these new means are not found in Defendants' quick-action brake, wherein there is no by-passage and no auxiliary-

* See disclaimer in patent in suit (p 726, also inserted folder in this brief).

† H. H. Westinghouse, the brake expert for Complainants, understands the patent in this way. He testifies (p. 153):

"182 X-Q. I will state briefly my understanding of the operation of the valve described in each of the three patents. In patent No. 360,070 the valve which controls communication direct between the train-pipe and the cylinder is opened *by means of the triple-valve piston acting mechanically upon it*; in patent No. 376,837 this valve is opened *by auxiliary-reservoir pressure acting independent of the mechanical action of the triple-valve piston*, and in patent No. 393,784 this valve is opened *by train-pipe pressure acting directly on it*. Is this statement correct?

"A. So far as the operations described are concerned I regard it as substantially correct."

valve actuated by the piston (or by anything else); but wherein the final movement of the piston uncovers the *same* passage from the train-pipe to the brake-cylinder as in the 1883 Boyden patent, and as disclaimed in the patent in suit.

Had the invention of the patent in suit been thus fairly presented on its proper basis, the foregoing facts would have demonstrated that no possible claim could have been drawn and sustained therein which Defendants would have infringed.

The invention of this patent, to wit, efficiency in securing an old effect by a modification of structure which made it unnecessary to provide, for use in making emergency stops, for more ample power or a larger passage from the auxiliary-reservoir to the brake-cylinder than that employed in ordinary service, is, in the presentation of this case, distorted beyond recognition into a new *process* performed by the triple-valve *piston*, "to produce quick-action."

It is to be noted that, while Westinghouse by the invention of the patent sued on, is enabled to employ a main-valve port of the same size for both service and emergency-stops, this being one of the things he gains by that invention, Defendants, on the other hand, open a *wider* passage through the main-valve port when using the brake for emergency-stops, this being the vital feature of the operation of the brake when so employed.

SUMMARY OF THE ARGUMENT.

We feel justified in drawing the following conclusions from what has preceded:

1. That the patent in suit is not the pioneer patent for the "quick-action brake," but that *per contra* it lacked just what the local-vent patent of 1879 lacked to make it a "quick-action" brake, namely—a quick acting motor.
2. That the patent in suit describes no new process, certainly no new process performed by the piston, and therefore cannot be sustained as to process or method.
3. That Defendants' brake, in so far as it accomplishes any result not accomplished by the brake-mechanisms existing prior to the patent in suit, does it by means not disclosed in said patent; and therefore that no valid claim could have

been based on the invention of the patent in suit which Defendants' structure would infringe.

4. That in Defendants' structure the agency of the piston in establishing communication between the train-pipe and the brake-cylinder is identical with the Boyden 1883 patent, and is in express terms disclaimed in the patent sued on.

5. That the Westinghouse brake, as it existed prior to the patent in suit, lacked one essential thing to give it the characteristic of quick-action, which essential or "indispensable" thing (a quick-action motor) the invention of that patent did not supply, and which is covered by a later patent not involved in this suit.

This brings us to the conclusion of the inquiry which we undertook to conduct. There remain several topics which come properly within the scope of that inquiry, discussion of which we have reserved to this point to avoid interruption of the direct thread of the argument.

MORLEY MACHINE COMPANY VS. LANCASTER,

(129 U. S., PAGE 263.)

Should the Court pass on the question of "pioneership," that question will undoubtedly be examined in connection with this leading case. Therefore a brief reference to the rule as therein stated and applied will be appropriate.

The Court held that Morley was a "pioneer" inventor because he was "the first inventor of an *automatic button-sewing machine*;" that is to say the patent involved *in that suit* disclosed the first machine which successfully did that work.

Having found that to be a *fact*, and that the successful machine comprised as its *essential* elements three sets of mechanisms, to wit, spacing mechanism, feeding mechanism, and sewing mechanism, the Court proceeded to construe the patent as broadly for a *combination* of those three sets of essential mechanisms, the omission of any one of which would have prevented the accomplishment of the result of the invention.

Infringement, under the rule of that case, depended upon finding in the Defendant's machine, not the *result* of the combination, but the *equivalent of each of these essential mechanisms, combined so as to produce that result.*

In the case at bar, granting that Westinghouse was the first inventor of a "quick-action brake," the two things which are "*both essential to the structure of the successful quick-action brake,*" according to the last judgment of the New York Court (quoted with approval by Complainants herein) are (1) the auxiliary-valve of the patent in suit, (2) the "supplemental piston or special motor" of the later patent, No. 376,837. The latter, according to this decision, is *a part that cannot be dispensed with*, and Complainants' counsel quote that finding and insist on its correctness.

Therefore, to apply the rule in *Morley vs. Lancaster*, it is necessary to find in Defendants' structure "the proper equivalent" for this "*indispensable part.*" That decision, after citing and explaining the pertinent decisions of this Court and of English Courts, proceeds to apply the rule deduced therefrom (p. 283):

"Applying these views to the case in hand, Morley having
 "been the *first inventor of an automatic button-sewing machine,**
 "by uniting in one organization mechanism for feeding buttons from a mass, and delivering them one by one to sewing-mechanism, and to the fabric to which they are to be secured, and sewing-mechanism for passing a thread through the eye of the button and securing it to the fabric, and feeding-mechanism for moving the fabric the required distances to space the buttons, another machine is an infringement, in which *such three sets* of mechanism are combined, *provided each mechanism, individually considered, is a proper equivalent for the corresponding mechanism in the Morley patent*; and it makes no difference that in the infringing machine, the button-feeding mechanism is more simple, and the sewing-mechanism, and the mechanism for feeding the fabric are different in mechanical construction, *so long as they perform EACH the same functions as the corresponding*

* By the invention of the patent sued on.

"mechanism in the Morley machine, in substantially the same way, and are combined to produce the same result."

And again—

"In all three of the main mechanisms used in the the Lancaster machine, the means employed in it are substantially equivalents of those employed in the Morley machine."

If, then, we attempt to apply this decision, arguing from the premise that Defendants' accomplish, in their brake, the same result which Westinghouse was the first to accomplish, we must find in the former the proper equivalent for *each* of the essential elements (*indispensable parts*) of the successful Westinghouse brake, performing *"each the same function as the corresponding mechanism in the Westinghouse machine."*

On examination we find in Defendants' brake no proper equivalent for the auxiliary-valve, (for the mechanism contains only the usual valves of the old triple-valve,) operating in substantially the same way; nor any equivalent for the other essential mechanism, the supplemental-piston. The inevitable conclusion is that Boyden has produced the result of "quick-action" by means substantially different. Those means consist of a *contraction* in the passage leading from the auxiliary-reservoir to the valve-chamber.

If, however, we had found that the perforated partition of Defendants' brake *is* the proper equivalent of the auxiliary-valve and of the supplemental-piston, nevertheless infringement could not be found under the rule of Morley vs. Lancaster, because one of these *essential elements* of the Westinghouse machine, which actually produced quick action, is covered by a patent *not involved in this suit*.

RISDON LOCOMOTIVE WORKS VS. MEDART,
(158 U. S. PAGE 68).

If Claim 2 of the patent sued on could be interpreted as for a process of admitting air from the train-pipe to the brake-cylinder by a certain movement of the piston, the question would arise whether, under the settled law of this Court, this operation constitutes a patentable process, as distinguished from the mere functions of mechanical elements.

Such an operation as discharging air, steam, or other agent, may manifestly be a process, as for instance where the agent acts upon a substance "to be transformed and reduced to a different state or thing" (Cochran vs. Deener, 94 U. S. 780). In the process of purifying middlings a current of air was one of the means which (with screening, grinding and rebolting) effected the object of the invention.

Another illustration is furnished by the sand-blast case (Hartell vs. Tillghman, 99 U. S. 547) where a blast of sand impinging upon glass, metal, etc., transformed it to a different state.

Whether the use of compressed air in a machine to exert pressure on a brake could, in any state of the art, be regarded as a process is extremely doubtful. In the air-brake the air acts simply as a mechanical element analogous to a lever, screw, belt or any other mechanical element, to convey power from the air-compressor to the point of application. Compressed air in the air-brake has simply the function of a spring, and in many arts is a well-known substitute for metal springs. But this question requires no discussion, since the process, if any, was old at the date of the patent. Compressed air had been admitted from the train-pipe to the brake-cylinder to perform its usual office there, and this had been done simultaneously with the admission of air thereto from the auxiliary-reservoir. Of novelty, therefore, there remains only the performance of these old operations *by certain specific agents combined in certain specific relations*, to wit, by a valve (governing a passage leading to the desired point) connected with and actuated by the triple-valve piston. The novelty, therefore, resides wholly in a specific arrangement of machine elements, each performing its customary function, and together performing an operation which was old.

The distinction between a patentable process and a function of mechanism, though not always easy to draw, has been recognized from the earliest times.

The famous patent of James Watt, the father of the modern condensing steam engine, provoked a learned discussion on this point in 1795 from the Court of Common Pleas and the King's Bench in *Boulton vs. Bull* (2 H. Bl. 463) and *Hornblower vs. Boulton* (8 F. R. 95). The patent specified the invention as a "method" whereof a salient feature consisted in "condensing the steam outside the working cylinders." The construction adopted to save the patent interpreted the inven-

tion as for the *combination* of the cylinders with external condensers. That there was no process or method involved was clearly elucidated by the opinions of the learned judges who were called upon to construe the patent. (See also the great English case, *Nelson vs. Harford*, 1 Webster's patent case.)

The distinction was first clearly drawn by this Court in *Corning vs. Burden* (*supra*), where the patent sued on claimed a process which consisted in treating masses of molten iron between a revolving cylinder and a curved trough, or equivalent devices. In defining a process the Court said :

"It is for the discovery or invention of some practical
"method or means of producing a beneficial result, or effect,
"that a patent is granted, and *not for the result or effect itself*.
"It is when the term process is used to *represent* the means
"or methods of producing a result that it is patentable, and
"it will include all methods or means *which are not effected by*
"*mechanism or mechanical combination.*"

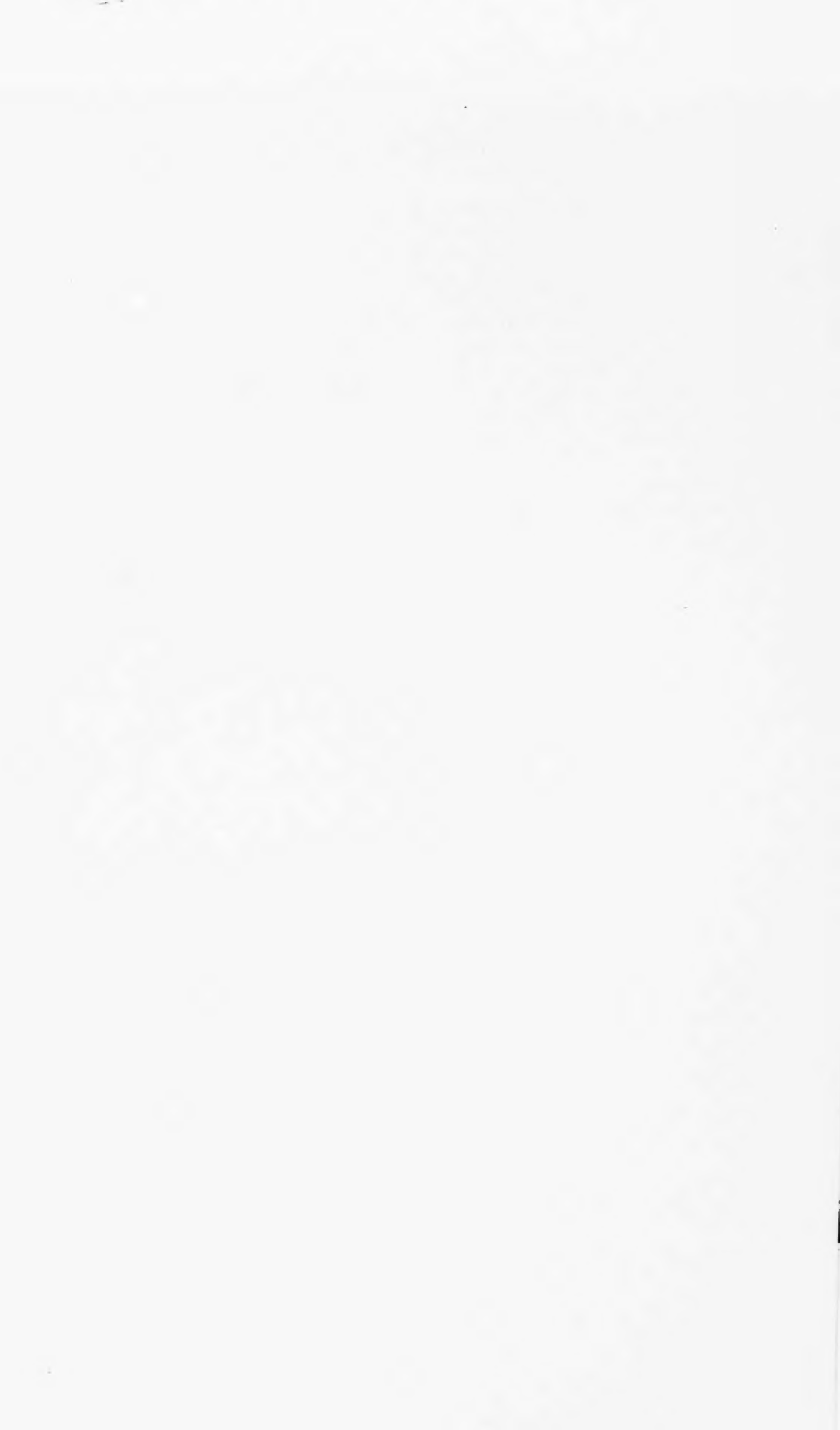
It will not be necessary to follow this doctrine through the cases in which it has been stated and applied in this Court, for the reason that in the recent decision in *Risdon Works vs. Medart* the Court, after quoting at length the definition given by Mr. Justice Grier in *Corning vs. Burden*, said :

"Although the cases are not numerous this distinction
"*between a process and a function has never been departed from*
"*by this Court.*"

The decision in the *Medart* case has by some courts and lawyers been regarded as drawing a distinction (not "between a process and a function") but between a process which is of a physical or chemical character, and a process that is of a mechanical character.

To those who observe the recent teachings of science it is not possible to perceive any philosophical distinction between these different manifestations of energy. Science points ever more and more steadily to a common origin for all forms and manifestations of energy. Whether for convenience we speak of a particular manifestation of force as vital, or chemical, or electrical, or mechanical, we recognize that these are, one and all, manifestations, in different aspects, of the same Force which pervades the universe. The patent law must observe the facts of the universe and can create no distinc-

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tion where none exists. It is not necessary, for the purpose of reaching the conclusion we have in view, to strain in the least the doctrine of the Medart case beyond what appears to us to be its clear import. It affirms and emphasizes all the previous decisions of this Court wherein the same question has arisen, establishing firmly that if the invention is a *machine* the patent cannot be sustained as for a *process*, even though the invention be claimed as such.

A fortiori, if the invention be a machine, and be described and claimed as such, the patent cannot be sustained "as to process or method."

ANALYSIS OF PATENT IN SUIT.

(SEE ANNEXED FOLDER.)

In order to lighten the labor of the Court and to make conspicuous the features alleged in the patent specification to be novel; and to show that no reference is made therein to a process or method, but that *per contra* its terms preclude such interpretation, the entire specification has been printed and arranged in three colors in the annexed folder. All the paragraphs and parts thereof in the specification and claims which pertain to *what is new* are colored red, those pertaining to the old prior brake art are black, and that pertaining to the prior art of 1883 is green. A perusal of the specification as far as printed in black will disclose the principal members and operations of the "old automatic brake," upon which the new invention is an improvement. It is sufficient to state that the "old automatic brake" consists of a *main-air pipe*, a *brake-cylinder*, an *auxiliary-reservoir*, and a *triple-valve*, the latter having a piston which has, and had prior to the invention in suit, *two traverses*, one the *preliminary* which was used to operate valves to apply the brake for service stops, and the other, the *further traverse* to operate another valve for emergency stops.

The first red paragraph (A) distinctly states that the invention consists of "*Improvements in Fluid Pressure Brake Mechanism*," not in a *method* or *process*.

The second red paragraph (B) sets forth the object of the invention—rapidity, effectiveness and economy being the *desiderata*. In

this paragraph no method, process or device is described for accomplishing the objects stated.

The third red paragraph (C) refers to an alleged "novel combination of four elements, namely, a brake-pipe; an auxiliary-reservoir; brake-cylinder; and a triple-valve device—all of which are acknowledged later on in the specification (in black) to be old in the art. The "triple-valve" device, however, is characterized as "*governing communications*," not providing the means of communication. Therefore the duty which the "triple-valve" device is to perform in the invention to be disclosed is not doing the work, but in "*governing*" the communications that *are* to do the work. "The improvements *claimed* are hereinafter fully set forth," *i. e.*, the improvements by which the *objects* stated in the preceding paragraph (B), and restated in the following fourth paragraph (D), are accomplished.

The fifth red passage (E) is part of a paragraph in which the patentee refers in general terms (afterwards stated specifically) to the old and new parts of the mechanism. The subject of this paragraph is "the triple-valve 10," which numeral designates on the drawings the entire triple-valve structure including both *old* and *new* parts. It is here stated that this "triple-valve 10" accords substantially with prior patents, and "is not claimed as of my present invention," except as to certain "structural features, by which it performs the further function of effecting the direct admission of air from the main air-pipe to the brake-cylinder." (The word "function" is employed here and elsewhere in this specification as if synonymous with "operation" or "effect.")

Before pointing out specifically what these new "structural features" are, the patentee proceeds to describe at length the *old* parts of the mechanism and their mode of operation. This occupies the the next five paragraphs of the specification, interrupted only by the brief red passage (F). This passage refers only to the minor detail of the small port 35 in the main-valve.

These five paragraphs, printed in black, embrace the description of the *piston*, with its shorter and longer movements (the terms "preliminary" and "further traverses," not being used in the specification), including the action of the piston in displacing, in its final movement, the stem 36. So far from there being a hint of any novelty in the

structure or operation of the piston, this long description of the old parts and their operation concludes with the statement :

"So far as hereinbefore described, the triple-valve accords
"in all substantial particulars with, and is adapted to operate
 "similarly to, those of my letters-patent Nos. 168,359,
 " 172,064, and 220,556."

This passage sharply draws the line in the description between the old parts of the triple-valve 10 and the new or additional parts, which are described in detail in the seventh red passage (G). These new parts, which enable the triple-valve "to perform the further functions requisite in the practice of my present invention" are specified as "certain additional members," to wit, the "auxiliary-valve 41" and the "passage 46."

It is particularly to be noted that, in this detailed description of the construction and operation of the *new* parts there is *no reference at all to the piston*. The auxiliary-valve 41 is described as "connected to" and moving with "the stem 36." There is not the faintest suggestion that the patentee has invented either a new process, or a new piston, or a new operation performed by the piston.

The eighth red passage (H) describes the operation of the additional members (*valve* and *by-passage*) upon a sudden and great reduction of train-pipe pressure, "when the piston of the triple-valve is forced to the extreme limit of its stroke," "carrying with it the stem 36." This describes not a new, but the old operation of the piston, the only novel operation being that of the valve.

The ninth red passage (I) refers further to the action of these additional members. It points out that the discharge of air from train-pipe to brake-cylinder is effected *by the auxiliary-valve and by-passage*—not by the piston—and that the supplemental port 35 of the *main-valve* is opened "*when* the piston 12 arrives at the extremity of its stroke."

The disclaimer, in green, effectually disclaims the Boyden brake of 1883, and also Defendants' quick-action brake, particularly *that office of the piston of the latter which is now pointed to as constituting identity of Defendants' brake with the alleged subject-matter of claim 2*, because the piston in Defendants' brake does nothing more than or different from that which is disclaimed.

In Claims 1 and 4 the new parts, in red, give patentability to the claims. Claim 2 is printed entirely in black, because the combination specified is in its entirety old (and so declared to be in the specification), the only new thing asserted being something alleged to be *done* by the piston, which allegation the entire preceding description contradicts.

From the foregoing we may deduce with great certainty the conclusions :

1. That the invention described pertains to "improvements" in "mechanism" (passage A).
2. That it consists in certain "*structural* features" added to the old parts of the triple-valve, and that save as to these *structural* features nothing in the construction or operation of the triple-valve is "claimed as of the (my) present invention" (passage E).
3. That in structure, function, and mode of operation, the piston is old, and accords with previous patents.
4. That the "structural features," or "additional members" which enable the organization *as a whole* to effect "the direct admission of air from the main air-pipe to the brake-cylinder" are the "auxiliary-valve 41" and "passage 46," (passage G).
5. That the effect, erroneously attributed in claim 2 to the piston, is that of an *organization* composed of many elements, whereof the salient and new elements (auxiliary-valve and by-passage) are not recited in the claim.
6. That no paragraph, sentence or word hints at any new process or method; but, *per contra*, the patentee explicitly says that he claims only certain "*structural* features."

The foregoing conclusions are confirmed by the Patent Office file contents, by the prior art, and the history of the development of the Westinghouse brake, as fully shown in previous parts of the brief.

Respectfully submitted,

LYSANDER HILL,
HECTOR T. FENTON,
MELVILLE CHURCH,
ANTHONY POLLOK,
PHILIP MAURO,

March 7, 1898.

Of Counsel for Defendants.

Addendum in Reply to Brief for Complainants.

The brief filed for Complainants on this third argument invites criticism on every page ; but the only matter which we deem worthy of any reply is the attempt made on page 28 to formulate a construction of Claim 2, which the Court is asked to adopt as the proper interpretation of that claim.

The claim as thus formulated modifies the language of the claim as found in the patent by inserting the words "*by opening a port*" after the words "preliminary traverse," and again after the words "further traverse." We have now another element brought into the claim, to wit, a "port," or, rather, "two ports," and are afforded thereby a clear recognition on the part of Complainants' counsel of the existence of what we have herein referred to (see p. 35) as the vice in Claim 2. They recognize that the claim is defective in not specifying the means which produce the effect, but reciting instead a device which merely conveys power to those means ; and they here attempt to obscure this defect by introducing an element (port) which may produce an appearance of conformity to the statute without sacrificing that indistinctness which alone makes the claim valuable to Complainants. If the Court recognizes the principle to which we have called attention they will have no difficulty in seeing that its application requires the presence in the claim of an auxiliary-valve and by-passage, or the equivalents thereof. The "port" does not produce the described effect any more than does the piston ; nor does the piston open a port.

But there is no justification for this formula ; on the contrary all the pertinent facts preclude its adoption. The specification does not ascribe the specified effect to a "port," but to an additional valve and by-passage. Every claim of the patent, including Claim 2, as interpreted to the Patent Office by the attorney who drew it, specifies these elements as the means which produce the described effect.

The charge of infringement which defendants were called upon to meet was based on the alleged use of an "auxiliary-valve" (additional to the usual valves of the brake-mechanism), controlling a passage from the train-pipe to the brake-cylinder. That charge has been met, and has been disposed of by both the lower courts. It falls when the conclusion is reached that valve 22 of Defendants' brake is not Complainants' "auxiliary" valve. The effort now is to find an interpretation of Claim 2 that will ignore its character as a combination claim and embrace means substantially different from those which the patent discloses for producing the described effect. This is not possible unless it can be construed and sustained as for a process, which our opponents concede cannot be done.

On the other hand we submit that Claim 2 can be sustained only by construing it as for a combination including with its recited elements (not a "port") but an auxiliary-valve and conduit controlled thereby and leading from the train-pipe to the brake-cylinder.

This interpretation is that of the solicitor who prepared it, is that upon which the Patent Office granted it, is that of the specification, and is supported by Complainants' *prima facie* proofs.

Nos. 99 and 116.

Supreme Court of the United States.

FILED.

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JAMES H. MCKENNEY,

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October Term, 1897. Nos. 99 and 116.

Brief of Hill for Boyden & Co.

BOYDEN POWER BRAKE COMPANY

GEORGE A. BOYDEN, President.

CHARLES B. MANN, Secretary.

WILLIAM WHITRIDGE, Treasurer.

AND
BOYDEN BRAKE COMPANY,

Appellants.

APPEAL.

VS.

GEORGE WESTINGHOUSE, JR.

AND

THE WESTINGHOUSE AIR-BRAKE CO.

Appellees.

GEORGE WESTINGHOUSE, JR.,

AND

THE WESTINGHOUSE AIR-BRAKE CO.,

Appellants.

VS.

BOYDEN POWER BRAKE COMPANY.

GEORGE A. BOYDEN, President.

CHARLES B. MANN, Secretary.

WILLIAM WHITRIDGE, Treasurer.

AND

BOYDEN BRAKE COMPANY,

Appellees.

CROSS-APPEAL.

THIRD ARGUMENT.

ADDITIONAL BRIEF FOR BOYDEN BRAKE CO.

LYSANDER HILL,

Of Counsel for Defendants.

IN THE
Supreme Court of the United States.

OCTOBER TERM, 1897.

No. 99.

BOYDEN POWER BRAKE COMPANY ET AL.,
Appellants,

vs.

GEORGE WESTINGHOUSE, JR.,
AND THE
WESTINGHOUSE AIR BRAKE COMPANY,

No. 116.

GEORGE WESTINGHOUSE, JR.,
AND THE
WESTINGHOUSE AIR BRAKE COMPANY,
Appellants,

vs.

BOYDEN POWER BRAKE COMPANY ET AL.

Can Claim 2 be Construed as for a Process?

This question involves two inquiries, viz: (1.) Even if the thing described in the specification involved a patentable process, can *this patent* be construed to cover it? and, (2.) Does the invention involve a patentable process?

We will consider these two subjects in their order :

I.

Does the Patent Describe or Claim a Process ?

The claim is in terms, for a mechanical combination. To construe such a claim as for a method or process is to do violence to its language. The settled rule of law is that the words of a patent, like those of any other contract, must be construed in their plain, ordinary, and usual signification ; and this rule will be clearly disregarded if this claim be construed as for a process or method.

This rule is never disregarded unless there exists some paramount necessity for so doing. The necessity exists only when it is clear that the words, if taken in their plain, ordinary, and usual signification, will fail to express the meaning intended by the parties. The intended meaning must be shown by the document itself, or, in case of a latent ambiguity, must be proved by other evidence ; in no case can it be derived merely from guess-work on the part of the Court.

The question then arises whether Westinghouse *intended* to take out a patent for a method or process instead of one for a mechanical combination, and whether the Government understood him as applying for a process or method patent and intended to grant him such a patent.

The patent and the application proceedings clearly negative any such theory, because the language found therein, both of himself and of his patent solicitor, Mr. J. Snowden Bell, is in irreconcilable conflict with any such theory. *That language could not have been used, and it never would have*

entered their minds to use it if they had had the idea that they were taking out a method or process patent.

(a) It is inconceivable that if they were intending to procure a method or process patent they could have drafted and filed a specification of more than five hundred and fifty printed lines in length without once even mentioning the word "method" or "process," or hinting that this was what they were trying to protect.

(b.) Mr. Bell, who drew the specification and claims, was an experienced and competent patent lawyer and solicitor—so competent that, in this suit, he was entrusted with the responsible duty of taking all the testimony on behalf of the complainants and of cross-examining the defendants' witnesses. He knew, as well as he knew his own name, that in all the great process cases—the chilled car-wheel, the Goodyear rubber, the driven-well, the torpedoing of oil-wells, the sand-blast, the fat-acid, the beer fermentation, the nickel-plating, the telephone, the Cochrane flour purifier, and other similar cases—the claim which was sustained for a process or method was, in express terms, *a claim for a process or method*, and that there is not a case on record where a claim, in terms for a mechanical combination, had been construed as for a process or method. If he had desired to secure a claim for a process or method and other claims for mechanical combinations, the Bell Telephone case taught him that the proper form of claim was: "The method of and apparatus for" accomplishing the desired result. It is simply inconceivable that such a lawyer could, while intending to patent a process or method, have drawn and filed a specification and claims which do not even hint at such an intention.

(c.) Mr. Westinghouse was not an ignorant "backwoodsman," unfamiliar with the meaning of terms used in mechanics and in patents, but an intelligent and able man,

of great experience in these matters, to the study of which his whole life had been largely devoted. His success in business shows that he is also a man accustomed to look closely after his own interests and to claim the full benefit of his legal rights. He knew the practical difference between a "process" or "method" and a "mechanism" or a mechanical "combination," as well perhaps as it is known to any member of this court.

(d.) It is absolutely inconceivable that, with the intention of patenting a method or process, either Mr. Bell or Mr. Westinghouse would have prepared and filed a specification which begins with these words: "Be it known that I, George Westinghouse, Jr., residing at Pittsburg, in the county of Alleghany and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful improvements in Fluid-Pressure Automatic Brake *Mechanism*, of which improvements the following is a specification." Here, there was sharply presented to their minds the very question of what the invention consisted in, and what they were going to describe and cover in their specification and claims; and they decided that it was not a method or process, but an improvement in the mechanism.

(e.) A few lines further on the same question was again sharply presented to their minds, and, at lines 20-27 of the specification, they declared that the invention "*consists in a novel combination*" of certain mechanical elements which they proceed to mention.

How is it *possible* that they could have made these declarations if they had understood that the invention consists in a new process or method and not in a new mechanical combination or mechanism?

(f.) Again, in claim 2, Mr. Westinghouse says, with the evident approval of Mr. Bell: "I claim as my invention and desire to secure by Letters Patent. * * * *In a brake*

mechanism, the *combination* of a main air-pipe, an auxiliary reservoir, a brake cylinder and a triple-valve," etc. Here, the claim is expressly limited, first, to a "mechanism," and secondly to a specific "combination" contained in that mechanism.

(g.) Finally as if to clinch the matter and leave nothing for future controversy, Mr. Westinghouse, in lines 41-46 of page 2 of his specification, expressly declared that he *did not claim* the triple-valve, "saving as to the *structural features by which it performs* the further function of effecting the direct admission of air from the main air-pipe to the brake-cylinder, as presently to be described."

It is seen, therefore, that the patent contains four emphatic declarations on the very point here in question, all concurring that the invention is an improvement in the mechanism, and not a word to show that either Mr. Westinghouse or his solicitor had the slightest idea that they were going to patent a method or process.

(h.) Two months after filing said specification, Mr. Bell, (January 19, 1887,) in his letter to the Commissioner of Patents again declared their intention to patent, not a process or method, but a mechanism, saying that "*When, however, the triple-valve is provided with an auxiliary-valve operated by its piston, which performs a new function additional to that of the triple-valve as previously employed, it is believed that such combination is wholly novel.*"

(i.) Moreover, throughout the entire specification, whenever Mr. Westinghouse or his solicitor had occasion to speak of the new work which the new mechanism performs, they do not refer to it as in the nature of a new method or process, but expressly as merely *a function of the new mechanism*. Thus, at page 2, lines 42 and 43, the patentee calls it "the further *function* of effecting the direct

admission of air from the main air-pipe to the brake-cylinder," and, at page 3, lines 44 and 45, he calls it "the further *functions* requisite in the practice of my present invention," while Mr. Bell, in his letter to the Commissioner, also calls it "a new *function* additional to that of the triple-valve as previously employed." The new work accomplished by the new mechanism addressed itself to their minds, not as a new method or process, but merely as a function of the mechanism described. If there was a new method or process involved, they evidently did not know it. To their minds, everything connected with the invention was mechanism, and its work was the mere function of mechanism. Nor is there any evidence that the Patent Office officials took any view of the matter different from that of Mr. Westinghouse and his solicitor. On the contrary, the fact that the Examiner refused to allow claim 2 until after Mr. Bell had, by his letter of January 19, 1887, declared that he was not seeking a broad claim, but only a claim for a specific combination containing the auxiliary valve as an element, shows clearly that the Examiner had no intention of granting a process claim.

Therefore, to construe claim 2 as for a method or process would be to do violence to its plain language, *not for the purpose of promoting, but of defeating*, the clearly expressed intention of the parties to the contract. Such a decision would overthrow the precedents, of a century and reduce the law relating to the construction of contracts and other documents to a state of absolute confusion.

Moreover, this court has repeatedly held, in the reissue cases arising since *Miller vs. The Bridgeport Brass Co.*, 104 U. S., 350 that in construing the claim of a patent the patentee is bound by his original intention to take a restricted claim,

and is estopped from subsequently attempting to enlarge such a claim. He can be relieved only in cases where there was some inadvertent error in the description, or where he intended to make a broad claim and by inadvertence, accident or mistake made a narrow one—and this, clearly, for the purpose of effecting, not of defeating, his original intention.

The fact that the clear language of a claim renders it narrower than the invention actually made by the patentee does not authorize the courts to construe its words other wise than in their plain, ordinary and usual signification.

“Where a claim is so explicit the courts cannot alter or enlarge it. * * * But the courts have not the right to enlarge a patent beyond the scope of its claim as allowed by the Patent Office, or the appellate tribunal to which contested applications are referred. When the terms of a claim in a patent are clear and distinct (as they always should be,) the patentee, in a suit brought upon the patent, is bound by it. (*Merrill vs. Youmans*, 94 U. S., 568.) He can claim nothing beyond it. * * * As patents are procured *ex parte*, the public is not bound by them, but the patentees are. And the latter cannot show that their invention is broader than the terms of their claim, or, if broader, they must be held to have surrendered the surplus to the public.”

Keystone Bridge Co. v. Phoenix Iron Co., 95
U. S., 274, 278-9.

Again, the proposed construction would make for Mr. Westinghouse a new patent, for a different invention; for this Court has repeatedly held that a process and a machine are not the same invention, and that for this reason, if no

other, a patent for a machine cannot be reissued for a process. (*Eachus vs. Broomall*, 115 U. S., 429; *Heald vs. Rice*, 104 U. S., 737, 753; *James vs. Campbell*, 104 U. S., 356, 376-7; *Wing vs. Anthony*, 106 U. S., 142).

Among the decisions of this Court, several cases are reported in which a claim, in terms for mechanism, was sought to be construed as a claim for a method or process; but in every instance the Court held the contrary. In some of these cases the patentee's right to cover a method or process was much clearer than in the case at bar. For example, in *Leroy vs. Tatham*, 14 How., 156, there was no doubt that the Hansons had discovered a property of metallic lead before unknown; and their invention utilized this property for an important industrial purpose. But their claim was for "the combination of the following parts above described, to wit, the core and bridge or guide-piece, the chamber, and the die, when used to form pipes of metal, under heat and pressure, in the manner set forth, or in any other manner substantially the same." The Court, speaking through Mr. Justice McLean, said :

"The patentees have founded their claim on this specification, and they can neither modify nor abandon it in whole or in part. The combination of the machinery is claimed, through which the new property of lead was developed, as a part of the process in the structure of the pipes. But the jury were instructed, 'that the originality of the invention did not consist in the novelty of the machinery, but in bringing a newly discovered principle into practical application.' The patentees claimed the combination of the machinery as their invention in part, and no such claim can be sustained without establishing its novelty— not as to the parts of which it is composed, but

as to the combination: *The question, whether the newly developed property of lead, used in the formation of pipes, might have been patented, if claimed as developed, without the invention of machinery, was not in the case. * * **

"We think there was error in the above instructions, that the novelty of the combination of the machinery, specifically claimed by the patentees as their invention, was not a material fact for the jury, and that on that ground the judgement must be reversed."

In *Crescent Brewing Co. vs. Gottfried*, 128 U. S. 158, 166, the claim was for "The application of heated air under blast to the interior of casks by means substantially as described, and for the purposes set forth;" and the court said that the claim "is a claim to the means or apparatus described for applying the heated air under blast to the interior of the casks, and is a claim for mechanism and not for a process."

In *Grier vs. Wilt*, 120 U. S. 412, 428, the claim was, in terms for mechanism. The complainant contended (see pages 425, 426): "That the patentee is the originator *"of an idea*, which is a novel and useful one, of raising the stack of trays from a point on the lowermost tray of the stack, thus making an opening for the insertion of a fresh tray containing fruit, and in this manner building the stack up from the bottom instead of from the top; * * * the object and value of the patent consisting not in the use of any special machinery for elevating the stack for the purpose intended, but the elevation and opening of the said stack at the bottom, for those purposes, by any machinery best calculated to attain that end." The Circuit Court adopted this view; but the Supreme Court held the contrary and reversed the decision below, saying (page 428) "*This is the effect or result of the mode of operation of the devices. The claim, however, is not for a process, but is only for mechanism.*"

In *Weatherhead vs. Coupe*, 147 U. S. 322, 333, the first claim was for mechanism, and the third claim for a method, but this court held that the method consisted, in substance, in using the mechanism specified in the first claim, and therefore could not be infringed otherwise than by infringing the first claim—in other words, that the third claim, notwithstanding its form, was substantially a claim for mechanism. The Court did not advert to the question whether the third claim was void for claiming merely the function of the mechanism specified in the first claim, but contended itself with saying, in substance, that as the defendant did not use the same mechanism, he did not infringe the patent.

In *Dreyfoos vs. Wiese*, 124 U. S., 32, 36, the claim was for mechanism, the operation of which was to impart a circular direction to the feed-motion by feeding faster at one end than at the other. It was contended for the plaintiff that as Beck was the first to devise a combination, the gist of which was to feed faster at one end than at the other, he was entitled to cover all variations in the form of the feed, so long as by any means it operates in this way; and that if that result is accomplished, the mechanism must be an equivalent for that of the plaintiff.

Both the Court below and this Court held that the patent *must be limited to the mechanism described and claimed*, and could not be extended so as to cover all mechanism for giving a circular direction to the feed-motion, nor to the process of operation of the mechanism described in the patent; and that the defendant, who used a different mechanical means for getting the same result, did not infringe.

In *Yale Lock Co. vs. Sargent*, 117 U. S., 373 (cited in the case last mentioned), the object of the invention was to obtain the variable action of two rollers with respect to the cam by which they were operated. The patentee, who

seems to have been the first in the art to utilize this principle, accomplished the result by using rollers of different eccentricity, and claimed rollers of varying eccentricity when combined with the cam. The defendant used rollers of equal eccentricity, and varied their action with respect to the cam by other means. It was contended that the patentee was entitled to cover the new and useful result which his mechanism produced; but this Court, reversing the decision below, held the contrary.

In *Burt vs. Evory*, 133 U. S., 349, the specification stated that the invention consisted in a *mode of constructing* a shoe, but ended by claiming a *shoe* having certain peculiarities of construction. The Court held that the patent was for a shoe, and not for a method; and laid stress upon the fact that the patentee's counsel, in his brief, had admitted such to be the fact.

Many other cases may be cited to the same effect, and, so far as we know, none to the contrary. The general principle of them all is, that no matter what may be the invention of the patentee, if he has limited his claim to a mechanism it must be construed as for a mechanism and cannot be enlarged to include a process or method.

II.

Does the Invention Involve a Patentable Process?

This brings us to the question: What is a patentable process?

A process may be patentable irrespective of the particular form of the instrumentalities used, (*Cochrane vs. Deener*, 94 U. S., 780, 787; *The Telephone Cases*, 126 U. S., 533); but where mechanism of a certain character is necessarily

used in carrying out the process, the process may be construed as involving such mechanism. (Lawther vs. Hamilton, 124 U. S., 1; LeRoy vs. Tatham, *supra*; Tilghman vs. Procter, 102 U. S., 707.)

"A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery. In the language of the patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new or patentable; whilst the process itself may be altogether new, and produce an entirely new result. The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence." (Cochrane vs. Deener, 94 U. S., 780, 788.) "It may be said, in general, that processes of manufacture which involve chemical or other similar elemental action are patentable, though mechanism may be necessary in the application or carrying out of such process, while those which consist only in the operation of a machine are not." (Risdon Locomotive Works vs. Medart, 158 U. S., 68, 72.) A process may include the entire series of steps employed in the production of a certain article, or it may, as in Fermentation Co. vs. Maus, 122 U. S., 413, involve but a single step in the series. If it consists merely in a series of manual or mechanical operations, involving only the skill or judgment of the experienced workman, it lacks invention, and for that reason is not patentable. And if, in these manual or mechanical operations, the workman uses improved tools or machinery, the protection, if obtained at all, must be obtained through patents on the new or improved tools or machinery. (Risdon Locomotive Works vs. Medart, *supra*.)

Where a process being new and involving a discovery, or the exercise of invention produces a useful *product*, new or old, or an improvement in a useful product, there is no doubt as to its patentability under our laws. In England it was for a long time held that in such cases the invention consisted in the product as a vendible commodity, and that the process of manufacture was not patentable; but for the past fifty years it has been held there as here, that, in such cases, the process of manufacture itself is patentable. Such a process is, in substance, an improvement in the *art of manufacturing* the useful product. In such sense the telephone process was an improvement on the art of producing, at a distance, a copy or copies of the words or sounds uttered in the neighborhood of the transmitting instrument; the driven-well process was an improvement in the art of constructing wells; the Cochrane purifier process was an improvement in the art of manufacturing flour; the Tilghman process, an improvement in the art of manufacturing fat acids; the Hanson process, an improvement in the art of manufacturing lead-pipe; the Neilson process, an improvement in the art of manufacturing iron; the Meller & Hoffman process, an improvement in the art of manufacturing beer, &c., &c. This court, in *Risdon Locomotive Works vs. Medart*, (158 U. S. 68, 77), said of these processes: "It will be observed that, in all these cases, the process was either a chemical one, or consisted in the use of one of the agencies of nature for a practical purpose." The Court might have said, with equal force, that in all of them the process was concerned in the production of some useful article or thing, either in the nature of a vendible commodity, or, as in the telephone production of sound-copies at a distance, something closely akin thereto—there was something which, in the language of *Cochrane vs. Deener*, was to be transformed and reduced to a different state or thing, by an act or a

series of acts. Even a preserving process may justly be regarded as but the last step of a series whose object is to produce the food of other article in a condition suitable for transportation or subsequent use. It is doubtful whether, under the laws of England or America, a process is patentable unless it is concerned in the production of a substantial product. In not a single case that we can call to mind has the Court ever sustained a process patent for an improvement in a *mechanism*, whereby merely its quickness of operation or power of action was promoted-improvements of this character having always been left to the protection afforded by mechanical patents. It would be a radical innovation, leading, no man knows whither, if the field of process patents were now enlarged to include these mere mechanical results.

The Courts have never given a terse and exact definition of a patentable process. Perhaps it cannot be done. In the *Medart* case, this Court, speaking through Mr. Justice Brown, said: "That certain processes of manufacture are patentable is as clear as that certain others are not, but nowhere is the distinction between them accurately defined. There is somewhat of the same obscurity in the line of demarkation as in that between mechanical skill and invention or in that between a new article of manufacture, which is universally held to be patentable, and the function of a machine, which it is equally clear is not. It may be said in general that processes of manufacture which involve chemical or other similar elemental action are patentable, though mechanism may be necessary in the application or carrying out of such process, *while those which consist solely in the operation of a machine are not.* By "elemental action" we understand the Court here to mean to exclude the mere mechanical action of the elements. With this understanding, perhaps a definition can be approxi-

mated by combining together the statements of the Medart, Cochrane and Burden cases, substantially as follows, viz.: "A patentable process is a process of manufacture consisting in an act or series of acts involving chemical or other similar elemental action, by which a substance or article is transformed and reduced to a different state or thing." Whether this definition be satisfactory or not it is certain, as above stated, that neither in England nor America have the courts ever sustained a process patent for an improvement in mechanism, whereby merely its quickness of operation or power of action was promoted. In all such cases the increase of quickness or power is a *mechanical result*, necessarily due to some physical change in the organization of the machine; and the *invention* consists in the devising of the change of organization which causes the new or improved result. The change of physical organization has brought into existence a new mechanical combination, or possibly a group of them. This new combination acts differently from the old, *because* it contains some mechanical element absent from the old, or some new arrangement or adjustment of the old elements, producing either a new kind of co-action among the several elements composing the combination or else an additional action not produced by the combination before. At all events there is a *new action*; and, in *Blake vs. San Francisco*, 113 U. S., 679, 688, this Court held that it must be new *in kind*, in order to confer patentability. The peculiar new action, in the combination, of the new element, adjustment or arrangement, is, of course, necessarily caused by a new mode of operation of the combined elements, and it is this new mode of operation that enables the desired result to be effected.

In *Winans vs. Denmead*, 15 How. 330, 341, this Court held that "the patentee may, and should, so frame his specification of claim as to cover this new mode of operation which

he has invented ;" but in the later case of *Burr vs. Duryee*, 1 Wall., 531, the same Court said (page 570) that the patent law gives "*no authority to grant a patent for a 'principle' or a 'mode of operation,' or an idea, or any other abstraction ;*" that (page 571 :) "*All others have an equal right to make improved machines, provided they do not embody the same, or substantially the same devices, or combination of devices, which constitute the peculiar characteristic of the previous invention ;*" that (page 572) the argument : "*That two machines produce the same effect will not justify the assertion that they are substantially the same, or that the devices used by one are, therefore, mere equivalents for those of the other ;*" and (page 573) that "*This is a flagrant abuse of the term 'equivalent.'*"

From these two cases, taken together, it follows conclusively that he who would cover a new "principle" or "mode of operation" in a machine, must first ascertain what new mechanical peculiarity of the machine in question it is that is necessary to the new mode of operation, and must claim such new mechanical peculiarity—in other words, he must claim the new device or mechanical means which produces the new mode of operation.

It was in this sense that the Supreme Court said in *O'Reilly vs. Morse*, 15 How. 62, 119 :

"Whoever discovers that a certain useful result will be produced in any art, machine, manufacture, or composition of matter, by the use of certain means, is entitled to a patent for it ; provided he specifies the means he uses in a manner so full and exact that anyone skilled in the science to which it appertains can, by using the means he specifies, without any addition to or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes the patent is void. And if it can be done, then the patent confers on him the exclusive right to

use the means he specifies to produce the result or effect he describes *and nothing more*. And it makes no difference in this respect whether the effect is produced by chemical agency or combination, or by the application of discoveries or principles in natural philosophy known or unknown before his invention; or by machinery acting altogether upon mechanical principles. In either case he must describe the manner and process as above mentioned, and the end it accomplishes. And anyone may lawfully accomplish the same end without infringing the patent, if he uses *means* substantially different from those described."

In the *Telephone Cases*, 126 U. S., 533, this Court discriminated sharply between a "discovery" and an "invention," saying:

"In doing this, both discovery and invention, in the popular sense of those terms, were involved; discovery in *finding the art*, and invention in *devising the means* of making it useful. For such discoveries and such inventions the law has given the discoverer and inventor the right to a patent—as discoverer, for the *useful art, process, method* of doing a thing he has found; and *as inventor, for the means he has devised* to make his discovery one of actual value."

So, also, *Corning vs. Burden*, 15 How., 266, 268.

III.

Application of These Principles.

In the light of these principles let us now consider the Westinghouse invention in controversy.

(a.) The first thing which arrests our attention is that the apparatus is not concerned with any manufacturing operation whatever—it is a mere device for applying power to arrest the movement of a railway car.

(b.) We also observe, in the same connection, that the invention in controversy is for the mere purpose of quickening the action of the machine when the engineer may desire so to do.

It may, therefore, be remarked at the outset that it is doubtful whether such an apparatus can, under any circumstances, be the legitimate subject of a patent for a process.

(c.) Pursuing our examination, we observe that the apparatus, generically considered, is not new—it is only an improvement upon prior automatic air-brakes. Its motive power is contained in compressed air, supplied by a pump on the locomotive, and stored up along the train in pipes and reservoirs, ready for use. This motive power is applied, as in the older automatic air-brakes, by admitting it from its storage connections to the brake-cylinder, where its expansive force moves the brake-piston. There is nothing new, therefore, in the power itself, or in the way in which, or subject upon which, it operates. It is the same old power, having the same old mode of operation. There was no new *discovery* involved; for the force of compressed air had been known and used, in various arts, for hundreds of years. If the action of artificially-compressed air could, by any stretch of language, be called “elemental,” in the sense in which that term is used in the *Medart* case, still there is nothing new about it; it is the same old element, producing its result by the same old capacity for expansion. Even if the patent at bar were the first in which the expansibility of compressed air had been utilized for a mechanical purpose, such use could not be monopolized by a patent any more than could the expansibility of compressed steam for driving boats or impelling machinery. (See *O'Reilly vs. Morse*, 15 How. page 115). The invention, therefore, is not in the nature of a “discovery,” nor does it involve any chemical action or any new “elemental” action or effect

whatever. It is simply a *machine*, which, through the presence of a new valve and air-passage, can, when the engineer desires, be made to operate more quickly than it did before such new valve and air-passage were added. A patent for the new valve and air-passage will, therefore, cover all the invention that was made.

The broad idea of producing quick action by the local venting of the train-pipe at each car, cannot be claimed in this patent, because it is the very gist of the invention set forth in the expired patent, No. 217,838, dated July 22, 1879, where Mr. Westinghouse said :

"It sometimes happens with such brake-apparatus, especially in case of accident" (emergency), "that material advantage could be effected by having *all the brakes of the train applied or brought into action simultaneously, or as nearly so as possible*. To accomplish this it is only necessary to make provision for the simultaneous opening of one or more ports in the air-conduit passage *at points not remote from each auxiliary-reservoir*. For this purpose I arrange at such various parts of the air-conduit *or communicating pipes* as may be desired, but by preference at the couplings, relief-valves of the kind shown in the drawings."

All that Westinghouse did, in patent 360,070, was to change the *form* of these relief-valves and operate them by the impact of the triple-valve piston. He simply combined the two old devices, the relief-valve and the triple-valve, adding the former to the latter and calling it his auxiliary-valve 41. It was probably a perception of this fact that caused his counsel to characterize the invention of patent No. 360,070 as a combination of *two machines*. Granting that he got a better effect, *there was no new process*, although there was a new mechanical combination. Boyden adds no relief-valve; he has discovered how to make the old triple-valve do the work without a special relief-valve.

- It is barely possible that the finding out in 1879 that by locally venting the train-pipe or its "*communicating pipes*" under each car throughout the train the serial action of the brakes would be quickened, or rendered simultaneous, "or as nearly so as possible," might be regarded as a "*discovery*," in accordance with the ruling of this Court in the Telephone Cases, 126 U. S., 533, entitling its finder to take out a patent for an art, process, or method. It involves, so far as can be seen, the only thing in the nature of a "discovery" that has ever emanated from Mr. Westinghouse in the brake-art. It either was a "discovery," in the sense of the patent law, or it was not. If it *was*, then the element of "discovery" was exhausted in 1879, and nothing remained to be done in 1886 except to "invent" an improvement in the means for applying the old discovery; if it was *not*, then, assuredly his subsequent application of the same principle by his combination of the old relief-valve with the old triple valve cannot amount to a "discovery." Courts must be logical and consistent in their reasoning. The stream cannot rise higher than the fountain; and if the original discovery and generic embodiment of the principle did not amount to a technical "discovery," surely the mere reapplication of that principle in an improved machine cannot.

(d.) More closely analyzing the new machine, we find it to consist of two parts, or two machines, combined together. Counsel for Westinghouse, in their brief in the Circuit Court of Appeals at Richmond, correctly described it as follows:

After referring to the old triple-valve of the prior art, they said:

"Westinghouse added to and combined with this brake *another brake mechanism*, which, on account of its novel predominant characteristic or function, had given to the whole apparatus its own name of *quick-action* or *emergency* brake,

both names being used. And he so combined these two mechanisms 'the service' and the 'quick-action' that while, in fact, they constitute two machines, they are also included in a *single structure*, and are put into a co-acting or operating mechanical relation with each other, as will presently appear."

The learned counsel saw in the device a "characteristic or *function*" which gives it its name, and the mechanical combination of two machines by which the *function* is effected; but they evidently saw nothing in the nature of a new process. To them, the invention appeared just as we have shown his attorney that it appeared to Mr. Westinghouse and Mr. Bell when they took out the patent in suit.

(c.) Considering, now, the "two machines," viz.: (1) the old plain triple-valve, and (2) the new auxiliary valve and by-passage, we find at once that the first, the old plain triple-valve, acts exactly as it always did—the patent expressly declares this to be true. The triple-valve piston actuates a valve which admits some of the compressed air to the brake-cylinder, just as in the old device. It, therefore, involves no new process or method. Turning next, to the second machine, the auxiliary valve and by-passage, we find the process or method the same as in the other—the piston actuating a valve which admits some of the compressed air to the brake-cylinder. In this instance, the valve admits air directly from the train-pipe to the brake-cylinder; but the admission of compressed air directly from the train-pipe to the brake-cylinder was old, being found in the Boyden patent of June 26, 1883, in all the air-brakes prior to the automatic, and in the automatic air-brake of the Westinghouse patent, 168,359, where it is claimed in claims 7 and 8. Still no new process or method, even in the baldest mechanical sense. Considering, lastly, the combination of the "two machines," we find

that the piston on its half-stroke, operates the one, and, on its full-stroke, both; and that this is the only peculiarity that appears in the combination. *But this is purely mechanical*, due to the peculiar arrangement of the valves, and possessing not a single characteristic of a patentable process or method. There is no "discovery," or "chemical" action, or "elemental" action about it, nor does it take part in producing any product. It is merely the "function" of the described mechanism; and if this is to be regarded as a patentable process or method, then scores of old decisions will have to be overruled, and the patent-law reconstructed on lines before unknown.

The claim requires no such ruling. As we have already remarked, it is, in terms, a claim for a mechanical combination of four old elements, one of which is a triple-valve having a piston. The claim states that this piston on its preliminary traverse admits reservoir air to the brake-cylinder, and on its further traverse admits train-pipe air to the brake-cylinder, but this statement is incorrect—the piston admits no air; it only actuates certain valves, and the valves admit the air. It is also incorrect in implying that the reservoir-air is admitted to the brake-cylinder only on the preliminary traverse; whereas, in fact, it is admitted both on the preliminary and the further traverse—on the preliminary traverse, by the graduating-valve, and on the further traverse, by the main valve. The distinction which the claim points out between the old and the new mechanism is, that the former, on both traverses, admitted only reservoir air, whereas the latter, on its final traverse, also admits train-pipe air—in other words, that, if the two combined machines contained in the new mechanism, (1, the old triple-valve, and 2, the auxiliary-valve 41 and its by-passage) the piston, on its half-stroke, operates the one, and on its full stroke, both. Here, then, is a claim for a *piston*

which consecutively actuates two valves controlling, respectively, two different passages; and the question is whether such a claim is for a mechanical device or for a process.

How can there be any *question* about it? It is purely a mechanical operation, dependent upon the construction and arrangement of the valves and their passages. Given, the particular arrangement of the valves and passages described in the patent, the so-called process is merely the *function* of the apparatus. Hence, it would seem to follow conclusively that the claim, if it means to cover this function, is void, and if it means to cover the mechanism which performs the function, it must necessarily be construed to involve the *new valve* by which the train-pipe air is admitted on the final traverse of the piston. The claim specifies nothing which this Court has ever included in its definitions of a patentable process or method, but it specifies that which, in *Corning vs. Burden* and *Risdon Locomotive Works vs. Medart*, was expressly interdicted from the category of patentable inventions.

We respectfully submit that there are but two ways of looking at this claim—it is either a claim for *mechanism*, or a claim for the *function* of a mechanism. It says, in terms, that it is for a mechanism; and, in the specification, Mr. Westinghouse tells us, as plainly as language can express the idea, that it is *not* for the function but for the *structural features by which it performs* the further *function* of effecting the direct admission of air from the main air-pipe to the brake-cylinder." (See page 2, lines 41-44.) Will the Court hold that it is for a certain thing when Mr. Westinghouse says it is *not* for that thing?

IV.

An Estoppel.

The Court should hold that the learned counsel and experts for Westinghouse have *admitted* the claim to be, not for a process or method, but for a mechanism which includes the new auxiliary valve 41 and its by-passage; and that this admission is conclusive upon the Court in this cause.

Those gentlemen and their experts have always taken that position. Their contention has invariably been that we infringe, not because we use the same process or method, but because, they say, we use their auxiliary valve 41 in another, but equivalent form. Thus, their expert, Mr. Newbury, says (Transcript, top of page 62): "My understanding is that Mr. Westinghouse is only entitled to claim the 'mechanical devices' combined together by means of which he is enabled to accomplish the quick-action effect or result; or, in other words, that he is entitled to claim mechanisms or instrumentalities combined together in substantially the manner set forth. Again, (near middle of page 28) he says: "This claim 2, when read in the light of the specification, as, I understand the matter, is for a combination of four essential elements or devices combined together to form a brake-mechanism." And (near bottom of page 46) he says that in his opinion the Boyden structure infringes the Westinghouse patent in suit, because "*In each there is an auxiliary valve or auxiliary valve device adapted to open direct communication between the main air or train-pipe and the brake-cylinder,*" etc. This is the theory upon which the complainants brought the suit, made up their evidence, and have always argued the case; and to which the defendants were obliged to direct their defense. *We have never been called upon to meet the charge that we are infringing a process or method, and*

have directed no evidence to that question. We respectfully submit that the complainants, having elected to take the position which they have taken, are bound by that election, even though it should lose them the case; and that the Court, at this late stage of the proceedings, has no right to change the issue. In *Burt vs. Every*, 133 U. S., 349, this Court laid special stress upon the fact that the patentee's counsel, in his brief, had admitted that the claim was to be construed as for a device, and not for a process or method.

Respectfully submitted,

LYSANDER HILL,

Of Counsel for Boyden Brake Co., et. als.

No. 400 and 406.
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Supreme Court of the United States.

October Term, 1896. Nos. 403 and 426.

BOYDEN POWER BRAKE COMPANY.
GEORGE A. BOYDEN, President.
CHARLES B. MANN, Secretary.
WILLIAM WHITRIDGE, Treasurer.
AND
BOYDEN BRAKE COMPANY,
Appellants.
vs.
GEORGE WESTINGHOUSE, JR.,
AND
THE WESTINGHOUSE AIR-BRAKE CO.,
Appellees.

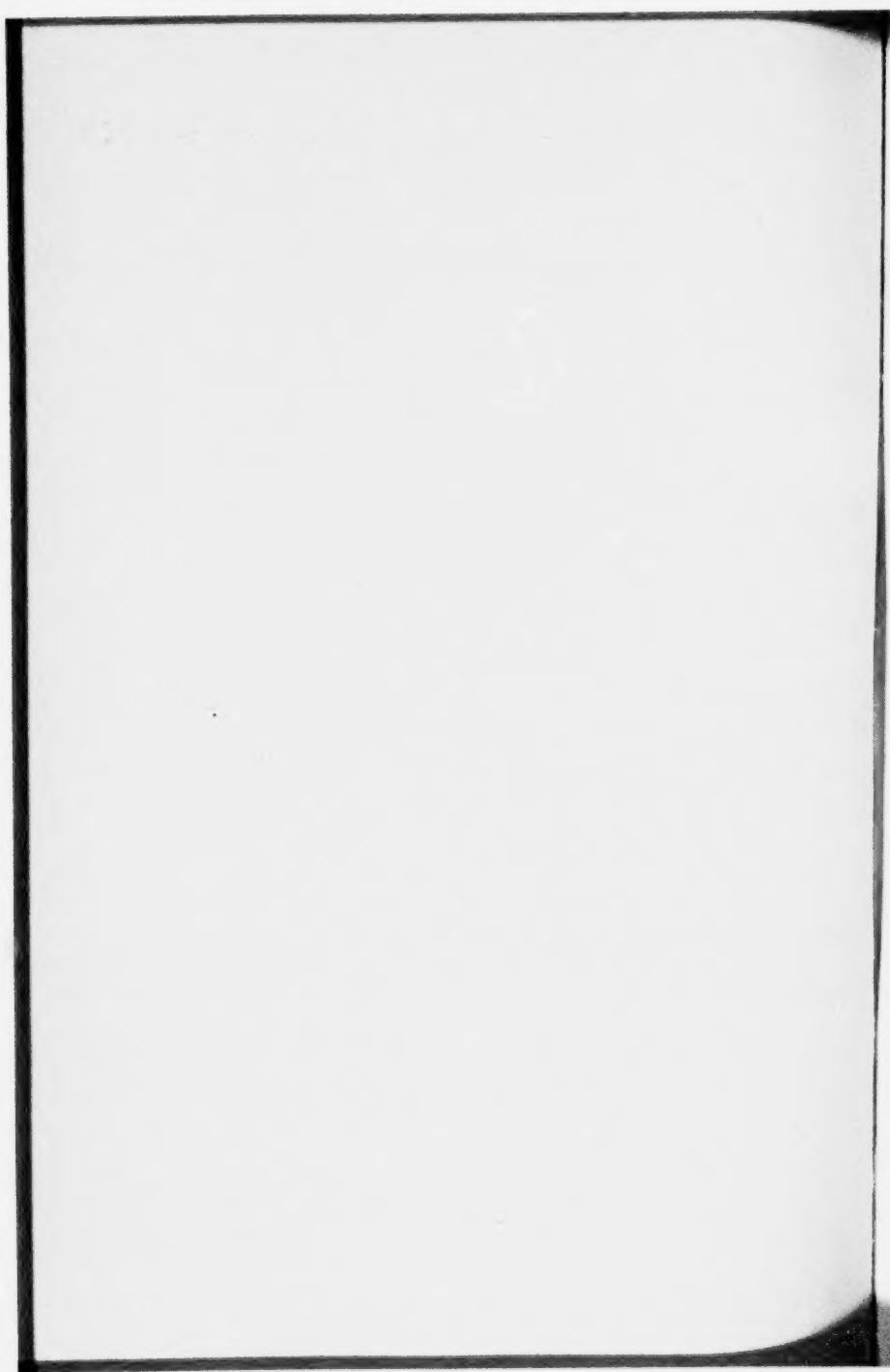
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} CROSS-APPEAL.

EXTRACTS FROM THE

Oral Arguments of Counsel
for Boyden Brake Co.



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CROSS-APPEAL.

WASHINGTON, D. C., *March 1, 1897.*

3.45 o'clock P. M.

EXTRACTS FROM THE ORAL ARGUMENT OF HECTOR T. FENTON, IN BEHALF OF THE BOYDEN BRAKE COMPANY.

May it please the Court, the questions which are presented in this record are, apparently, complex; but in point of fact they are exceedingly simple. If your Honors will kindly open the defendants' brief at page 68, you will observe two illustrations, the first of which is patent No. 220,556, the old triple valve, and the second of which is the patent in suit, No. 360,070. The upper picture represents the old automatic triple-valve, and

below it is the same valve exactly, plus the "additional members," consisting of an auxiliary-valve and by-passages, which your Honors will observe colored in red.

The defendants' machine, as plaintiffs will admit, and as the drawings show (opposite p. 69, defendants' reargument brief), has no by-passage other than what it had before in the old art. It has no valve other than what it had before in the old art. But it produces exactly the same result as the complainants' machine does. Why? Because Mr. Boyden discovered, as I shall show to your Honors later on by a parallel case, that the principle of a segregated machine, to wit, these "additional members," was wholly unnecessary to produce this quick-action result. He discovered that he did not need any segregated passage-way leading from train-pipe to brake-cylinder, nor did he need any auxiliary-valve to control that passage-way. How does he get the result? He discovered, may it please the Court, that he could go back to the old art which showed a triple-valve having a check-valve in its piston, and by producing differential pressures in the valve-chamber of the old triple-valve he could make it operate to obtain both the old automatic result and the quick-action result, thereby developing the latent powers of the triple-valve, and wholly dispenses with the "additional members" of the patent in suit or their mechanical equivalent in any form. When you understand that principle of the defendants' machine and when you look at the complainants' patent, you may see for yourselves whether you can reason out from the complainant's patent, or anything shown in his drawings or described in his specifications, the principle involved in the defendant's machine; and if you cannot, that is the end of this case. There is but one single issue involved here, and that is the issue of infringement.

MR. JUSTICE WHITE: Take it for granted that your premise is correct, would not a different rule apply to the patent of Mr. Westinghouse in determining whether these were equivalent to

his patent, and whether he was entitled to a very broad construction of his patent?

MR. FENTON: No, sir; I have in the brief four of the leading cases about pioneer patents—*O'Reilly vs. Morse* and *Morley vs. Lancaster*, and two others—which I will refer to in the course of the argument, when I reach that part of the case, and I shall show your Honors that there never has been a decision in this Court, even in the case of a pioneer patent, which will hold one machine to infringe another, if you reach the conclusion that the second machine does not involve the principle of construction of the mechanism used in the first machine, no matter if it produces the identical results, and no matter if the result was absolutely new with the complainant. That is exactly what this Court said in the case of *O'Reilly vs. Morse*, and it is exactly what you said in *Morley vs. Lancaster*, and what you said in two or three other cases.

MR. JUSTICE BROWN: Is not the decision in *O'Reilly vs. Morse* to a certain extent in conflict with the telephone case?

MR. FENTON: I think not.

My learned colleague asks me to suggest to your Honors, which is true, that the claim in controversy in the Bell telephone case was a method claim, and he will fully discuss that point in his argument.

File Wrapper of Patent in Suit.

I shall not take up the time to discuss the first and the fourth claims. In my humble judgment the first and the fourth claims are too plain to need any discussion; but I will take up the second claim and see what it is. It is the second claim that opens the door to an argument. The second claim reads in this way:

"2. In a brake mechanism, the combination of a main air-pipe, an auxiliary-reservoir, a brake-cylinder and a triple-valve having a piston whose preliminary traverse admits air from the auxiliary-reservoir to the brake-cylinder"

So far as I have read to you I have read only the combination of elements entering into the old automatic brake of 220,556. But the claim goes on to say :

“and which, by a further traverse, admits air directly from the main air-pipe to the brake-cylinder, substantially as set forth.”

That description of the function of the new machine is the only *new thing* in the claim, that is “and which, by a further traverse, admits air directly from the main air-pipe to the brake-cylinder, substantially as set forth.”

What means are to be imported into this claim to carry out this function of admitting train-pipe air to the brake-cylinder, because the elements referred to in the claim, will not perform the function without some means are applied in the claim. That is admitted on both sides.

What are those means? The means is undoubtedly a new “auxiliary-valve,” actuated on the further traverse of the piston, which valve controls a direct passage-way leading to the brake-cylinder.

When Mr. Westinghouse went to the Patent Office with this application, he was met with a rejection of this identical claim 2 in controversy, as well as a rejection of claim 1, which does not appear in this patent and which he erased and substituted a new claim for it. He was met with a rejection of these claims on a reference to Boyden's patent of 1883. He said this in regard to claim 2, and these are strong words :

“It is to be understood that applicant does not seek to broadly claim a device for admitting air directly from main air-pipe to the brake-cylinder.”

Then he goes on to describe several devices which do that.

“When, however, the triple-valve is provided with an auxiliary-valve, operated by its piston, which performs a new function additional to that of the triple-valve as previously employed, it is believed that such combination is wholly novel.”

Now what was his first claim which was *rejected*? His first claim was this:

"1. In a brake mechanism the combination of a main air pipe, an auxiliary-reservoir, a brake-cylinder, and a triple-valve, provided with a device for admitting air directly from the main air pipe to the brake-cylinder, substantially as set forth."

Then what did Mr. Wettinghouse do with this first claim? He substituted a new claim in which he changed the word "device" to "auxiliary-valve, independent of the main-valve." The Patent Office, the Circuit Court, and the Circuit Court of Appeals have all said that when Mr. Westinghouse spoke of the "auxiliary-valve" he spoke of a valve which was "independent of the main-valve" and not one with it, and part and parcel of it—not one valve performing two functions, but a valve independent of the main-valve, not only functionally independent of it, but physically independent of it.

But bear in mind this: that when the Patent Office rejected that original first claim, they also rejected this allowed second claim on the same reference. The two claims were rejected together. It was in order to get that second claim, the one now in controversy, passed by the Patent Office, that Mr. Westinghouse wrote the letter which I read to your Honors a moment ago, and which I will read again:

"When, however, the triple-valve is provided with an auxiliary-valve operated by its piston, which performs a new function additional to that of the triple-valve as previously employed, it is believed that *such combination is wholly novel*." R., p. 718, l. 41.

This letter clearly defines the meaning of claim 2.

This statement conclusively implies an *auxiliary-valve* in claim 2. The contents of this file containing this letter absolutely preclude the possibility of construing the allowed

claim 2 (allowed *after rejection*, allowed *after erasure* of the broad statement, allowed after erasure of this original first claim, and allowed *after receipt of this letter* defining the invention of *this claim 2* as a "combination" of an "auxiliary" valve with the old triple-valve, the piston or its "further" traverse being the actuating means), as being for the triple-valve *per se* admitting the train-pipe air to the brake-cylinder without any "auxiliary-valve" or any mechanical equivalent therefor in any imaginable form.

The Finding of Fact as to Non-identity by Three Tribunals.

We have taken the old triple-valve device which your Honors see, having a graduating valve and a main valve, and we have turned that into a machine which will accomplish the result, by doing what? Have we put in an additional passage-way which we did not have before? No. Have we added another valve that it had not before? No. Have we caused the piston to do anything more or less than it always did? No. We have taken the old triple-valve element, and have partitioned the valve-chambers to create differential pressures therein.

Your Honors will have to hold, in order to find identity, that the partitioning of the valve-chamber of the old triple-valve is the equivalent of adding a separate passageway and an additional auxiliary-valve to control it. *You cannot reason that out from the patent.*

In order to find identity, may it please the Court, the plaintiff will have to satisfy your Honors that, on the record in this case, three different tribunals, one after the other, made a mistake. In order to sustain their proposition that our main valve is the equivalent of their auxiliary and main valves combined; they will have to show your Honors that the Patent Office, when they considered our application for a patent, made a mistake.

Then they will have to take up the record and show to your Honors that Judge Morris, in the Circuit Court, was mistaken. Judge Morris stated that our black valve was a main-valve and not an auxiliary-valve, and that our yellow valve was the graduating-valve. He held that distinctly. They will have to reverse that on this record.

Then they will have to take up the opinion of the Court of Appeals and show to your Honors that the Court of Appeals made a mistake about the same thing, because all three of these tribunals, one after the other, said that our main valve was not the auxiliary-valve of Westinghouse, but was the old and original main-valve of the triple, and that it was none the less a main-valve of the triple, because by partitioning the valve-chamber it performed the additional function of admitting train-pipe air to the brake-cylinder.

On the Question of Non-Identity.

I ask your Honors, in considering the re-argument brief, pp. 43 to 54, to look at the somewhat famous case of *Burr vs. Duryee*, which I have taken the trouble to elaborate in the brief, because, in my humble judgment, that case is exactly on all fours with this.

In *Burr vs. Duryee*, counsel said this:

"Wells was the first who introduced any guiding and directing mechanism, and his introduction of that between the rotating picker and former produced a new machine, viz., the first machine which could successfully make hat bodies from the flying fur by guiding and directing the fur from the picker to the former. He may, therefore, treat as infringers all who used the machine with only a substitute for one of the parts of the combination, performing the office of the part for which it was substituted."

That is precisely the claim that is made here to-day by the learned counsel on the other side. What did Judge Clifford say

in answer to that proposition? He discusses the peculiar characteristics of the Wells invention, and says that it has a tunnel or guide between the picker and the rotating cone. Then he says that in the defendant's machine there is no tunnel or directing mechanism; just as in ours, we have no auxiliary-valve or separate and distinct segregated passage-way. We use the old main-valve and the old passage-way for reservoir-air to transmit train-pipe air to the brake-cylinder. Then he goes on to say:

"Now, an infringement involves substantial identity
 "whether that identity be described by the terms, same
 "principle, same *modus operandi* or any other. It is a
 "copy of the thing described in the specifications of the
 "patentee, either without variation, or with such varia-
 "tions as are consistent with its being in substance the
 "same thing. If the invention of the patentee be a
 "machine, it will be infringed by a machine which
 "incorporates in its structure and operation the sub-
 "stance of the invention; that is, by an arrangement of
 "mechanism which performs the same services or pro-
 "duces the same effect in the same way, or substantially
 "the same way." (1st Wallace.)

He says here, that the argument in that case, which is substantially similar to the argument in this case, is an argument not that the two machines are alike in principle of construction, but is an *argument that they produce the same result*, and he says that when you argue that because two machines produce the same result they are equivalent, it is an abuse of the term "equivalent."

If we apply the test which was applied in *Burr vs. Duryee* to this case, your Honors will see how forcible the argument is here. Suppose that Mr. Westinghouse's patent to-day was a reissued patent? I have shown you from the original patent that the machine which he describes is a combination of these old elements, plus these additional members. Suppose he had reissued that patent and described this thing? Would your

Honors hesitate for an instant to say, upon a comparison of the two things, that he was taking a reissue for a *different* invention? Is it any the less a different invention because it is made the subject-matter of a subsequent patent to an independent inventor? Certainly not.

The Burden of Proof on Plaintiff.

I now desire to call your Honors' attention to one other matter which seems to me to be of controlling importance. You have here a single issue in this case, an issue of fact: Are these machines identical or are they different? The patent is not attacked for want of novelty. It is not attacked for invalidity in any respect upon any proper construction of its claims; but it is a pure, bald issue of fact, infringement or non-infringement.

Now the burden of proving that, as we all know, is on the plaintiff, who seeks to discharge that burden by his testimony in chief. And when the defendant comes into court and lays down their patent with broad claims in it, differentiating this device from that device; when, upon the face of the defendant's patent you see that the patent itself is based upon this question of identity, then, I say, that under the decisions of this court which are cited in full in the brief, the latest of which is the *Miller vs. Eagle Company*, 151 United States, the burden of proof is shifted back on the plaintiff.

Have they answered it? In this case you have heard remarks made by learned counsel who opened the case for the Westinghouse Company, that Mr. Westinghouse said this and Mr. Westinghouse said that. The Mr. Westinghouse who said these various things was not Mr. Westinghouse the patentee, but his brother. Mr. George Westinghouse, the inventor, is one of the plaintiffs in this case. The plaintiffs are the Westinghouse Air Brake Company and George Westinghouse, Jr. Has Mr. George Westinghouse dared to come upon the stand and say that his

invention included the invention described and claimed in the Boyden patents? No, sir; he is silent.

Has Mr. Boyden come upon the stand and told you the evolution of his device in controversy. Yes, sir, frankly, and he has been cross-examined at length.

When you consider upon whom is the burden of proof; when you consider the file and contents of the application for the patent in suit; when you consider the granting of the patent to us raising a prima facie conclusion of radical differences; when you consider the broad claims in our patent, which the patent office must have passed upon and did pass upon; when you find that even under their own theory the Circuit Court has said that our main pop-pet-valve 22 is not the auxiliary valve 41 of the patent in suit; when you find that the Court of Appeals has said the same thing upon this issue of fact, upon that vital question in the case, you must also consider that you have no answer from Mr. George Westinghouse denying our proposition. You have Mr. George Westinghouse absolutely silent upon that question. I say, may it please the Court, that he has not discharged the burden of proof, and that the case ought to be with us.

EXTRACTS FROM THE
ORAL ARGUMENT OF LYSANDER HILL
 ON BEHALF OF THE BOYDEN BRAKE CO.

May it please the Court, I shall commence my remarks by referring to a point which was suggested by one of your Honors yesterday; to wit, the condition of the law as to what are and what are not pioneer inventions.

As I understand the law, there are four great decisions of this Court which have substantially laid down all the law that is involved in this case. Those four cases are: *O'Reilly vs. Morse*, 15 Howard; *Burr vs. Dwyer*, 1 Wallace, and *Morley vs. Lancaster*, 129 United States, which were cited by my friend, Mr. Fenton, and the more recent case of the *Incandescent Lamp Patent*, 161 U. S.

In *O'Reilly vs. Morse*, the great Morse telegraph was involved. In the patent for which Mr. Morse had made a claim for the transmission of intelligence to a distance by means of a current of electricity, irrespective of the means employed. This Court, as your Honors are perfectly well aware, held that claim (the 8th) to be invalid, as being a claim for an effect or result, and such has been the law, not only in this court, but following it in all other courts of this country, and in England too, from that day to this.

In the English courts, prior to the case of *O'Reilly vs. Morse*, the question had arisen in the great case of *Neilson vs. Harford*, on the hot-air process of smelting iron. Neilson made a very broad claim, in that case, as your Honors will remember, and the English courts, after great litigation and after argument by the most eminent counsel in the realm, came finally to the conclusion that the patent could not be sustained as for the

result of manufacturing iron by the use of the hot-air process; but that the patent was to be treated as a patent, practically, for a combination of mechanical elements which were used by Neilson in producing this result. Upon looking at his patent and the description given therein, they found that the combination of elements which he used consisted of three in number, to wit, the smelting furnace in which the iron was to be treated; a fan blower or equivalent air-pump for creating a blast of air, with a pipe leading from the blower to the smelting furnace; and, interposed between the fan blower and the smelting furnace, a heating device to heat the pipes through which the air passed to the furnace, so that the air started in its movement by the fan blower and heated in its course by the heating device, would enter the smelting furnace hot and produce the result.

The English Court held that if the Neilson's patent was to be considered broadly for the means of applying hot air in a blast furnace, it would be invalid as for a principle, or a result or an effect; and in order to validate the patent it was necessary to confine it to the means which were employed by Neilson for effecting the result. Those means were the combination of three elements, the fan-blower, the smelting furnace and the heater arranged between the blower and the furnace.

That case practically notified the world that if anybody else found any other way of applying hot-air to a blast furnace, any different way of using even these elements it would avoid the patent. For example, if it had been found practical to put the fan-blower between the heater and the furnace, that would, under their construction, have avoided the claims of the patent. The combination must be a combination of those three elements arranged in that way.

That has been the law of England from that day to this. They do not allow, any more than this Court allows, a claim for a result or effect, but they limit the inventor *to the means* by which he produces that result or effect and to the means

or their mechanical equivalents which he describes in his patent for producing it. Such was the doctrine of the case of *O'Reilly vs. Morse*, in this court.

The question was asked yesterday by Mr. Justice Brown, whether there was not something in the Bell telephone decision which had modified that theory of the law, to which question I now desire to answer most emphatically, No. There is nothing in the Bell telephone decision that modifies *O'Reilly vs. Morse*, in any respect whatever, as I understand the decision, and I think I understand the facts upon which the decision was based. The Bell telephone patent raised a different question altogether. The broad claim in that patent was *not* for an effect or result. It was for a method. Bell was not claiming the transmission of vocal sound to a distance by a current of electricity, as Morse was. If he had made *such* a claim this Court would have immediately pronounced the patent invalid, on the same ground that they held Morse's eighth claim invalid. Helmholtz, long before Bell's time, had discovered the fundamental laws of sound. He had discovered the form of sound waves and he had found the peculiar fact that sound waves in the air are not abrupt, but are undulatory; that each wave is in form a combination of what musicians call *crescendo* and *diminuendo*. It commences and rises like a wave of the sea, and then settles down again to a level, gradually and not abruptly. Sound waves are capable of being delineated graphically by serpentine lines, by sinuous waved lines, such as appear in a rope when one end is fastened to a post and you take the other end in your hand and wave it up and down. Helmholtz discovered that *that* was the peculiar form which sound waves take in the air. Before Bell's time, Philip Reis, in Germany, had attempted to invent a telephone. He was a philosopher, and was perfectly familiar with the Helmholtz theory of sound waves. He undertook to transmit sound, not by putting the current on the line in the form of an

undulatory current, but by a sharp make and break current, and to transfer that into undulations in the diaphragm. That was his attempted method of reaching the result. It failed because the receiver was incapable of transmitting the sharp, abrupt make and break current on the line into gradual undulations and sinuous movements.

Bell, as held by this Court, evolved another theory. He evolved the theory that if he could go back one step from Reis and take the current on the line wire and put that current into the form of undulations, he could then accomplish the result, because the receiving diaphragm would then take the same vibrations as the current on the line. Bell therefore provided *a method* or mode of transmitting speech, not as Reis had done, by a make-and-break current, and by seeking to transform that into undulations at the receiver, but by the other method of putting on to the telephone line itself a current in the form of an undulation. He skillfully drew his patent to cover that as his method—not to broadly cover a current of electricity—but to cover the method of transmitting speech by putting upon the line wire these current undulations which could be graphically described by sinuous or serpentine curves, and his claim was for that method.

I hold in my hand Volume 126 United States Reports, in which Bell's claim was discussed by the Court, and on pages 531, 532 and 533 your Honors will find the point at which the Court discussed that question.

The Court said :

“In this art—or, what is the same thing under the
“patent law—this process, this way of transmitting
“speech, electrically, one of the forces of nature, is
“employed: but electricity left to itself will not do
“what is wanted. The art consists in so controlling the
“force as to make it accomplish the purpose. It had
“long been believed that if the vibrations of air, caused
“by the voice in speaking, could be reproduced at a dis-

"tance by means of electricity, the speech itself would
 "be reproduced and understood. How to do it was the
 "question.

"Bell discovered that it could be done by gradually
 "changing the intensity of a continuous electric current,
 "so as to make it correspond exactly to the changes in
 "the density of the air caused by the sound of the voice.
 "This was his art. He then devised a way in which
 "these changes of intensity could be made and speech
 "actually transmitted. Thus his art was put in a condi-
 "tion for practical use.

"In doing this, both discovery and invention, in the
 "popular sense of those terms, were involved. Discovery
 "in finding the art, and invention in devising the means
 "of making it useful. For such discoveries and such
 "inventions the law has given the discoverer and
 "inventor the right to a patent—as discoverer for the
 "useful art, process method of doing a thing he has
 "found, and as inventor for the means he has devised to
 "make his discovery one of actual value. Other inventors
 "may compete with him for the ways of giving effect to
 "the discovery, but the new art he has found will belong
 "to him and those claiming under him during the life of
 "his patent. If another discovers a different art or
 "method of doing the same thing, reduces it to practical
 "use, and gets a patent for his discovery, the new dis-
 "covery will be the property of the new discoverer, and
 "thereafter the two will be permitted to operate each in
 "his own way without interference by the other. The
 "only question between them will be whether the second
 "discovery is, in fact, different from the first.

"The patent for the art does not necessarily involve a
 "patent for the particular means employed for using it.
 "Indeed, the mention of any means, in the specification
 "or descriptive portion of the patent, is only necessary to
 "show that the art can be used: for it is only useful
 "arts—arts which may be used to advantage—that can be
 "made the subject of a patent."

The Court is now speaking of claims for a method. Passing to the next page, the Court refers to this very case of *O'Reilly vs. Morse*, and says:

"In *O'Reilly vs. Morse*, 15 Howard, 62, it was decided "that a claim in broad terms for the use of the motive "power of the electric or galvanic current called electro- "magnetism, however developed, for making or printing "intelligible characters, letters or signs at any distances, "although a new application of that power first made by "Morse, was void because it was a claim 'for a patent for "an effect produced by the use of electro-magnetism, "distinct from the process or machinery necessary to "produce it'; but a claim for 'making use of the motive "power of magnetism when developed by the action of "such current or currents as set forth in the foregoing "description, as a means of operating or giving motion "to machinery, which may be used to imprint signals "upon paper or other suitable material, or to produce "sound in any desired manner for the purpose of tele- "graphic communication at any distances,' was sustained. "The effect of that decision was, therefore, that the use "of magnetism as a motive power, without regard to the "particular process with which it was connected in the "patent, could not be claimed, but that its use in that "connection could."

The Court further says, at the top of page 535:

"We see nothing in *Morse's* case to defeat *Bell's* claim. "On the contrary, it is in all respect sustained by that "authority."

There is nothing in the case of *O'Reilly vs. Morse* that conflicts or interferes with the view of the law which this Court expressed in the Bell telephone patent. There is no conflict between the two decisions. In the Morse case he simply sought to claim the use of the electric current, generally, without any reference to a method, the machinery or means for marking signs at a distance. In Bell's case, if the Court is correct

in its conclusions, there was the discovery of a certain method by which an undulating current of electricity which when transmitted under a condition which he describes and which was the subject of his invention, would accomplish that result, and his claim was made for that method, and was sustained as being for that method.

The case of *O'Reilly vs. Morse*, as I understand it, has never been doubted or modified in any respect whatever, either in this country or in England since the decision was made in 1853. On the contrary, it has been repeatedly affirmed, both here and there.

I would like to read to your Honors the language of the Court in the case of *O'Reilly* against *Morse* and embody it in my argument, because I am satisfied that no lawyer at the bar can state the principle of the law more clearly and more logically than it is stated in this opinion :

"Whoever discovers that a certain useful result will be produced, in any art, machine, manufacture or composition of matter, by the use of certain means, is entitled to a patent for it; provided he *specifies the means* he uses in a manner so full and exact, that any one skilled in the science to which it pertains can, by using the means he specifies, without any addition to or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes, the patent is void; and, if it can be done, then the patent confers upon him the exclusive right to use the means he specifies to produce the result or effect he describes, and nothing more. And it makes no difference, in this respect, whether the effect is produced by chemical agency or combination; or by the application of discoveries or principles in natural philosophy, known or unknown before his invention; or by machinery acting altogether upon mechanical principles. In either case

“he must describe the manner and process as above mentioned and the end it accomplishes, and *any one may lawfully accomplish the same end without infringing the patent, if he uses means substantially different from those described.*”

No principle of law was ever stated more clearly by any court than this principle is stated by this Court.

Burr vs. Duryee Case.

The case of *Burr vs. Duryee* has been referred to by my learned friend, Mr. Fenton. That case was also a case of a pioneer invention or discovery—a pioneer patent.

Your Honors will find, if you choose to refer to it, in Mr. Fenton's re-argument brief, p. 52, a full illustration of the machines in that case, pointing out the difference caused by defendant omitting the interposed guiding tunnel. The defendant made a different combination and avoided the combination of the patent, and this court held that the patent, although a *pioneer* patent, did not cover the machine *when that element was omitted*. It was an essential element of the combination described in the patent, and this court was obliged to hold that its use was essential to the patent, and that he who discovered how to omit it avoided the patent. This court was obliged to so hold in order to be consistent with its own repeated decisions.

Incandescent Lamp Case.

The incandescent lamp case was a recent case decided by the judges who are now on the bench, or nearly all of them, about two years ago. That is a case which, in my judgment, is “on all fours” with the case which is before you today. Your Honors will remember it, for you heard and decided it. Sawyer and Man had discovered that carbonized paper fibre was a useful element out of which to construct the filaments of incandescent electric lamps. They took out a patent upon it,

and as paper fibre is a vegetable substance, the attorney who drew their patent thought that he could broaden their patent for them and make it squarely cover all possible infringements by taking it in its character as a "*vegetable fibre*" and describing the discovery or invention as a discovery of a *vegetable fibre*. The claim, therefore, was drawn for the use of "carbonized vegetable fibres" or textile material in constructing the filaments of incandescent lamps. When that case came before this Court, your Honors held that Sawyer & Man had not discovered all vegetable fibres or the utility of all vegetable fibres for that purpose. They had discovered the utility of *paper* fibre for constructing the filaments of incandescent lamps, but yet that fact did not entitle them to go beyond their discovery of paper fibre and include all kinds of vegetable fibres within the range of their discovery. They had *not* discovered that all kinds of vegetable fibres would produce the result.

It turned out upon investigation that a good many vegetable fibres were not suitable for making filaments for incandescent lamps, but only some of them were. Among those which were of a proper character for that purpose Edison afterwards discovered that the fibre of a certain bamboo which grows in Japan and the Eastern islands was peculiarly fitted for that purpose, and was better, even, than the paper fibre. After investigating all the vegetable fibres that he could learn of or bring under his processes of investigation in his laboratory, he settled down upon *that bamboo fibre* as the best fibre known or attainable for the purpose, and he patented it and used it. Of course Sawyer & Man, the owners of the patent, brought suit against the Edison Company for an infringement of their patents. Edison was using "carbonized vegetable fibre" material, and their patent broadly covered carbonized vegetable fibre material.

Why was it not an infringement? Sawyer & Man were the first to use carbonized vegetable fibre in the form of this

paper fibre. But your Honors told the complainants there, Sawyer & Man, or their representatives, that the discovery that paper fibre was suitable for that purpose was not a discovery that *all vegetable* fibres were suitable for the purpose, and that their discovery was limited to paper fibre. They had discovered *that*, and they had not discovered anything else; and although the terms of their patent were broad, covering the whole vegetable world, you limited them right down to carbonized paper fibre, upon the ground that *that* exhausted their discovery. The defendant, in that case, was held not to infringe.

I say that the principle of that case is "on all fours" with the case here, and that is the general principle which runs through all these pioneer cases, or cases of so-called pioneer patents.

A man who has made a discovery is entitled to a patent commensurate with that discovery. If the terms of his patent or the claims go beyond the actual invention which he has made, they must be restricted, by construction, and confined to the invention which he has made. Bell's claim was for the method of putting the undulatory current on the line wire. It was not necessary to restrict that, because *that* was the invention which was made. In the case of the hat-body machine, the claim was for a combination of three elements, the picker, the guiding tunnel, and the receiving cone. That was the combination described. But your honors held, in that case, that if anybody left out one element of *that combination* they avoided an infringement.

In the Neilson case, in England, the Court construed the invention as including three elements, the fan-blower, the heater and the furnace, arranged in that relation, and they held that if anybody omitted any one of those elements, such omission avoided the combination.

These were all "pioneer" patents; but a pioneer patent is limited to the invention which it describes. Because it is a

pioneer patent it is not to be taken as broadly covering, not only what the man invented, but everything also that others could invent to accomplish the same result. If anybody could discover to-day, or hereafter, that speech could be transmitted telephonically by the use of some other current than the undulatory current on the line, the inventor would be entitled to a patent free of the Bell patent. The Court so held and so stated, in terms, in their decision. Bell's monopoly was based upon the fact that during the seventeen years of the existence of the patent nobody did discover any other way of getting electric transmission of speech except by the use of this undulatory current on the wire; but, *non constat*, that might be discovered at some future time. But it has not yet been done, and Bell's patent, while it stood, covered all the ways known to us for the transmission of electric speech; but the Court left it free, and his claim left it free, for anybody to discover some other way of producing that result, and to patent it and maintain the patent.

Let us apply that principle to the patent here. Mr. Westinghouse made a certain invention in 1886. He discovered that if he would take the old triple-valve, without changing it, which did not produce that rapid serial effect, and would make another passage-way from the train-pipe to the open atmosphere or to the brake-cylinder—for he first put it in the form of a passage-way to the atmosphere, and next in the form of a passage-way to the brake-cylinder—and control that new passage-way by a *new valve* which had not been on the apparatus before, and operate that new valve with the triple-valve piston, so that in making the emergency stop the triple-valve piston would move out and strike and unseat that new valve, compressed air could be admitted into the brake-cylinder from the train-pipe. *That* was his (Westinghouse) invention. There is no other to be found in his patent. His invention consisted in that new combination.

He patented that combination. The patent cannot go beyond it, because there was nothing beyond it described. If his

patent in terms goes beyond that combination, your Honors should say to him just as you said in effect in the case of *Sawyer and Man*: "You have drawn a patent which goes beyond your invention, and includes what you did not discover or invent; and your patent, therefore, must be limited back to your invention by construction."

Mr. Boyden discovered that the old triple-valve *per se* possessed latent powers unknown and undeveloped, and he invented means, partitioning the valve-chamber, by which those latent powers were brought into active service to vent the train-pipe air simultaneously with the admission of auxiliary-reservoir air to the brake-cylinder. By Boyden's invention the old main-valve of the triple-valve was made to vent both the airs. Therefore it is obvious that Boyden uses the old triple-valve to vent the train-pipe air, whereas Westinghouse invented "additional member" to the triple-valve, which forms no part thereof. Plainly the case at bar is on all fours with the Incandescent Lamp case.

The Patent in Suit not a Pioneer, not a Success, nor is it Used.

But when Mr. Westinghouse made that combination of this patent 360,070, here in suit, he did not accomplish what my learned friend, Mr. Christy, told you yesterday by means of that patent. Mr. Christy said that the invention consisted in reducing the time of the application of the brakes throughout the length of the train from twelve seconds to two seconds. It is true that was done, but it is *not* true that it was done with this patent. This patent did not by any means reduce the time of application from twelve seconds to two seconds. The reduction of time from 12 seconds to 2 seconds was accomplished by a patent taken out by Mr. Westinghouse a year later, patent No. 376,837, dated in January, 1888. Under the patent in controversy Mr. Westinghouse undertook to accomplish the result of *preventing*

shocks on long trains. Did he do it with this invention? No. The result shown by the tests at Burlington, Iowa, was to more than double the amount of the shock to the train. Instead of the device of this patent tending to prevent and reduce the shock, it *increased* it to such a ratio that while in the first test made in 1886 with the old triple-valve the shock was in the proportion of 49—the slidometer moved 49 inches in response to that shock—the second test, in May, 1887, when Westinghouse came to try the Device of the patent here in suit, the shock was 103 inches, or more than double that under the old triple-valve. The device was then and there withdrawn as unfit and unsafe for use, and it never was used afterwards. He then and there abandoned the use of the structure and never resumed it. The device of this patent in suit has never been advertised by him to the world. You cannot find it in any catalogue issued by the Westinghouse Company from that day to this. It never has been manufactured from that day to this, and it never has been sold by that company from that day to this. The reason for that is it was deemed too dangerous to sell.

On that point, I wish to read the testimony of Mr. Herman Westinghouse, the brother of Mr. George Westinghouse, who did not testify in his own behalf. Commencing on page 117 of the transcript:

“The result of these tests were disappointing. None
 “of the competitors, in the estimation of your committee,
 “did satisfactory work, owing to the *violent shock pro-*
 “*duced in stopping.*”

After the experiments made at that test, the Master Car Builders' Committee in charge of the tests reported in these words:

“At the conclusion of the 1886 trials, the committee
 “felt that to sum up any results in the face of so large a
 “field for improvement, could not but be unsatisfactory,
 “and while a wonderful advance has been made in the

"brake problem, as will be seen by a comparison of the stops of each year, *the 1887 tests* (with the device of patent in suit) *apparently leave the field for improvement open as wide as in 1886.*"

Then they go on to recommend, *not* this brake, but an electric brake, and they say :

"While we are not prepared to make any definite recommendation at this writing as to what freight train brake should be generally adopted, our present information, derived from the recent tests, points to two conclusions:

"1st. That the best type of brake for long freight trains is one operated by air, and *in which the valves are actuated by electricity.*"

That type of brake was shown, and it was found to answer the purpose perfectly. There was absolutely no shock when the air was admitted to the brake-cylinder by the action of valves actuated by electricity. Then follows on pages 127 and 128 a tabulated statement of the *slide* of the shock-measuring instrument, and the degree of the shock in the 1887 test. With the Westinghouse fifty-car train the shock in inches is shown to be 103, afterwards 70 $\frac{3}{4}$, and afterwards 70 $\frac{1}{2}$, and then this device of patent in suit was dropped.

The committee then says that the brilliancy of the Westinghouse record—that is, of the air-brake test—"was completely spoiled by the fearful shock given at the rear end of the train."

The same train was then tested electrically, with the following results :

Shock denoted by the instrument in inches, *none*. There were four tests and no shock whatever, not even an inch, while that of the Westinghouse device, under the patent in controversy, was 103 inches.

Mr. Herman Westinghouse, in his testimony, says :

"The conclusion of the 1887 trials, instead of furnishing to the railroad the desired information upon which

"to take prompt and reasonable action, seemed to show
 "that *much yet remained to be done* before it could be
 "safe to make a practical move in a matter of so great
 "importance. These sentiments are clearly expressed in
 "the committee's conclusion of the 1887 trials."

Somewhere in the record, although my eye does not light upon it now, he states that the train with the device in suit was withdrawn from further test on the ground that it *was not deemed prudent to use it*, and it was not tested again. In the course of his testimony he says that they have never made these brakes from that time to this, nor sold them since, nor advertised them in their catalogue.

This, then, is their so-called "pioneer" patent, a patent which did not accomplish the result and which doubles the injury. Moreover, it is not a pioneer patent in the sense of being the first to utilize or to state the principle of quick-action—the local venting of the train-pipe at each car. *That was* fully and completely stated in the prior patents of Mr. Westinghouse, in 1879, No. 217,838. In that patent a full description was made of the effect of venting the train-pipe at numerous points along the train, not remote from the auxiliary-reservoir of each car, and this patent says that the injuries resulting from the old system are avoided by the use of such expedients and a *nearly simultaneous* application of all the brakes is produced.

My friends on the other side say of this patent 217,838 that it was not practical. They say they did not make it and put it into use. We answer, they did not make this device of the patent here in suit and put it into use after its defects were shown at Burlington. *If the 1879 device is not practical for that reason, neither is this, for the same reason.*

But the defendants in this case made a complete set of 217,838 suited for fifty cars, and tested them at their works in the presence of complainants' counsel, and under all the conditions that could be demanded for their use. They were found to work just as well as this device in suit works. My brother

Christy said here yesterday that while the valve of that patent 217,838 could be opened, *it could not be closed*. Mr. Christy was not present when they were tested; he is mistaken. There is not the slightest trouble in closing that valve. In these experiments made in Baltimore with the fifty brakes of that patent, the valves were closed as easily as they were opened. That is a mere fiction of my brother Christy's imagination. That device will both open and close the valves, and it is a "quick-action" device.

Mr. Westinghouse, himself, was not even the first to discover the utility or principle of action of that relief-valve, which is the fundamental law of quick-action. The prior English patent to Sanders, in 1879, referred to by Mr. Newberry, the Westinghouse expert, in the course of his testimony, also exhibited that kind of a quick-action relief-valve. They are all quick-action valves, because their effect is to locally vent the train-pipe under the different cars and produce quicker action.

"Shock," in stopping a long train quickly, is caused from the fact that without those local vents the air has to travel the whole length of the train-pipe to get out at the front end; but if there can be numerous vents provided along the train-pipe, the air will escape much quicker and thereby cause the application of the brakes much more quickly. And wherever those local vents are provided in an air-brake which is capable of operation, the whole principle of quick-action devices is involved and made public, and it then becomes merely a question of the form of a device or the construction of a device. He who subsequently takes out patents on a quick-action device must limit his invention or claims to the construction of his device, or to his particular combination. I do not mean to say that he must limit it down to the structural form, in that one thing must be round and not square, or anything of that kind; but I mean that he must limit it to the combination of elements which he invents as a means for obtaining quick-action.

May it please the Court, increased power in the brake-cylinder was not the essential object of this invention. There was no trouble in getting all the power that was necessary under the old, plain triple-valve. You cannot, in these air-brakes, increase the power beyond a certain degree. If you apply the brakes with too great power you slide the wheels of the cars on the track rails, and if you slide the wheels of a car even once you are liable to ruin every wheel by wearing flat spots on the wheel rim. You have to carefully guard against that, and you must apply the brake power to such an extent only as will check the wheels and not stop their rotation—not slide them. If you apply more than fifty or fifty-five pounds air-pressure in the brake-cylinders on these levers, as they are now constructed, you will be liable to slide the car wheels and thereby ruin them.

There was no trouble in getting fifty or fifty-five pounds of air-pressure with the old automatic brake; not the least. The old automatic brake gave a pressure in the brake-cylinders of forty or fifty pounds, and more if you wanted it. All you had to do to get greater pressure was simply to enlarge your auxiliary reservoirs. There was no trouble about that. Ordinarily the auxiliary reservoir is about double the capacity of the brake-cylinder. If it was only of the same capacity as the brake-cylinder, then when the air from the reservoir was admitted into the brake-cylinder, if there was seventy pounds of pressure in the reservoir, it will equalize in the brake-cylinder at thirty-five pounds, one half in each. Now, plainly, if the capacity of the reservoir is made twice as large as the brake-cylinder, and there was seventy pounds in the reservoir, the air will equalize in both at about forty-seven pounds of pressure. Make the auxiliary-reservoir a little larger, and on equalizing the air-pressure you would have fifty or fifty-five pounds in your brake-cylinder.

In the argument of the case in the Court of Appeals below, this fact was admitted by my learned friend, Mr. Betts, on the

other side. I hold in my hand a printed report of the arguments before the Circuit Court of Appeals at Richmond, where my brother Betts says:

"But here let me say that quick-action does not involve
 "greater power of the brake. It is not a question of
 "greater force of brakes as applied to the brake-shoes of
 "any individual car. The force with which the brake-
 "shoes are applied to any individual car is no greater
 "with the Westinghouse quick-action brake, which is in
 "controversy here, than it was with the old automatic
 "brake."

So increase of power was not the point. The point was to get
 "quick-action."

What Mr. Westinghouse was after was to *vent the train-pipe quick*, so as to produce rapid serial action in the brake, and *thereby prevent shock at the end of a long freight train*. He did not accomplish it with this patent. He accomplished it with a subsequent patent taken out in 1888—No. 376,837—a patent we are not sued on.

Why did they fail to accomplish it here? And why did they finally accomplish it there? Because the second patent, the patent of 1888, the successful one, went back, in plain terms, to the old relief valve of 1879 and adopted that form, which had a supplemental piston.

When Mr. Westinghouse put *that* old 1879 device into his triple-valve case he achieved success, and not till then. In the patent in suit he did not put in that device.

In the latter patent, after the device in suit had failed at Burlington, and had been discarded, Mr. Westinghouse, according to the record, spent about four months in trying to discover how he could make a valve that would operate. It was no easy matter. Mr. Herman Westinghouse testifies at considerable length as to the great difficulties involved in overcoming the troubles experienced in the Burlington tests, and in devising a

new brake which would relieve the shock; and it was only after car load after car load of materials had been sent from Pittsburgh to Burlington, and the whole summer of 1887 had been spent in working upon it, that it was discovered how to accomplish the result. Herman Westinghouse says when he did accomplish that result he produced a brake which has become the standard brake since that time. That is true. What did he produce by that four months of effort? What did become of the standard brake from that time on? We answer the device of patent 376,837, dated January, 1888. The Westinghouse brake of commerce to-day. You do not see any slide-valve in this latter device actuated by the further traverse of the piston, but you have here a reproduction of the old device of the 1879 patent, 217,838, the relief-valve patent. You have the supplemental piston and the valve taken bodily from the old device of 1879. (See illustrations p. 89, re-argument brief for Boyden.)

When he got that device, which consisted simply in transferring this old relief valve from the train-pipe, as he had it in 1879, to the triple-valve casing, and putting it in a separate chamber and operating that supplemental piston by air let in through the main-valve, he got a successful device. But so long as he relied on the auxiliary-valve, actuated by the further traverse of the piston, he was totally unable to accomplish the result. When he got the valve of patent 376,837 of 1888, and found that it accomplished the result in two seconds, that form of valve, 360,070, the patent in suit disappeared.

We are not sued on the patent of 1888. The suit against us is on the 1887 patent, which has been discarded by Westinghouse himself. He has not brought any suit against us on the successful patent.

Supreme Court of the United States

OCTOBER TERM, 1895.—Nos. 847 and 878.

BOYDEN POWER BRAKE COMPANY—

GEORGE A. BOYDEN, President ;
CHARLES B. MANN, Secretary ;
WILLIAM WHITRIDGE, Treasurer—

AND

BOYDEN BRAKE COMPANY,
Appellants,

vs.

GEORGE WESTINGHOUSE, JR.,

AND

THE WESTINGHOUSE AIR-BRAKE CO.,
Appellees.

Appeal.

GEORGE WESTINGHOUSE, JR.,

AND

THE WESTINGHOUSE AIR-BRAKE CO.,
Appellants,

vs.

BOYDEN POWER BRAKE COMPANY—

GEORGE A. BOYDEN, President ;
CHARLES B. MANN, Secretary ;
WILLIAM WHITRIDGE, Treasurer—

AND

BOYDEN BRAKE COMPANY,
Appellees.

Cross-Appeal.

PETITION.

THE PETITION OF BOYDEN POWER BRAKE COMPANY, GEORGE A. BOYDEN, PRESIDENT; CHARLES B. MANN, SECRETARY; WILLIAM WHITRIDGE, TREASURER; AND BOYDEN BRAKE COMPANY, PARTIES TO SAID APPEAL AND CROSS-APPEAL.

Your petitioners humbly pray that said cause, which was brought to this Court by a writ of *certiorari*, issued on the 27th day of January, 1896, to the Circuit Court of Appeals for the Fourth Circuit, may be advanced and set for hearing at an early date, to be fixed by this Honorable Court, the circumstances of this case being special and peculiar, within the meaning of Rule 26, and not liable to furnish a precedent for other cases.

The grounds upon which your petitioners pray this relief are given below, together with brief statements of facts necessary to the proper understanding of them. They are as follows, to wit:

1. The automatic air-brake for railroad cars was originally invented by George Westinghouse, Jr., about the year 1872, and his broad patent for it expired in 1889. It operated by means of what was called a "triple valve." It was well adapted for short trains, such as passenger trains; but when applied upon long freight trains it proved impracticable, because, in stopping the train suddenly with the full force of the brakes, in cases of emergency, the interval between the setting of the brakes on the extreme forward cars and the extreme rear cars was sufficient to produce great "shocks" upon the latter, or, in other words, sufficient to allow the rear cars, while yet free from brake pressure, to run forward at full speed and collide, with great violence

and often disastrous results, against the forward cars already checked in their movement by the speedier application of their brakes.

The application of electricity had made the fact known that, if all the brakes on a long train be set with full force at substantially the same moment, all the cars will "slow down" simultaneously, and there will be no "shock." The employment of electricity, however, to operate the valves of an air-brake apparatus was objectionable; and it became desirable therefore, that other means should be contrived whereby the interval between the application of the brakes upon successive cars should be reduced sufficiently to prevent the destructive end collisions of the rear cars when applying the brakes suddenly with full force.

George Westinghouse, Jr., contrived, and on March 29th, 1887, patented, in his patent No. 360,070, one means designed to accomplish this result. His invention consisted in a new "auxiliary valve," actuated by the piston of the old triple valve, to locally reduce the pressure in the air-pipe in cases of emergency, and thus quicken the application of the brakes upon the next succeeding car. This patented apparatus did not work satisfactorily on long trains, but *confessedly increased* instead of reducing their "shocks." He subsequently improved it by providing a supplementary chamber and special piston for operating the auxiliary, or emergency, valve, and obtained a patent for this improvement, No. 376,837, dated January 24, 1888. As thus improved it gave entire satisfaction, and has gone largely into use. Some 400,000 cars, according to the statements of complainants' counsel, having already been fitted up with it. Suits on both of these patents were subsequently brought in the Southern District of New York against the New York Air-Brake Company, who used the *auxiliary* emergency valve, the *supplementary chamber* and the *special piston* to operate it; and the Courts rightly sustained both patents and held the New York Air-Brake Company guilty of infringement. In their opinions in those cases the Court held that the invention of patent 360,070 consisted in the

new *auxiliary or emergency valve*, while that of patent 376,837 consisted in the new *supplementary chamber and piston* actuating that valve.

In 1888, George A. Boyden, one of your petitioners, invented another and radically different means for accomplishing the same result. He did not resort to the use of an "auxiliary" or special emergency valve at all, as did Mr. Westinghouse, but contrived to *make the old triple valve itself* produce the desired result, without the aid of Mr. Westinghouse's device or any mechanical equivalent thereof. For this invention, he received broad generic patents, dated August 16th, 1892, upon application filed September 30th, 1889. Your petitioners, Boyden Power Brake Company and Boyden Brake Company, became successively the owners of these Boyden patents, and have put the invention into successful practical use on a number of railroads.

On the 12th day of December, 1889, George Westinghouse, Jr., and The Westinghouse Air-Brake Company began suit against your petitioners in the United States Circuit Court for the District of Maryland, charging that said Boyden air-brakes infringe the *first, second and fourth* claims of said Westinghouse patent, No. 360,070. Several years were spent in getting the case ready for trial, and finally it was argued before His Honor Judge Morris, at Baltimore, in November, 1894. Judge Morris held, in substance, that the Boyden brake does not employ the auxiliary, or emergency, valve of the Westinghouse patent, and, therefore, does not infringe the *first and fourth* claims thereof; but that the *second* claim of said patent is entitled to cover *functional equivalents*, or, in other words, results, and, in that view of the case, that this claim was infringed. Your petitioners appealed; and, on the 11th day of November, 1895, the United States Circuit Court of Appeals, sitting at Richmond, Va., affirmed Judge Morris' decision on the *first and fourth* claims, but reversed it on the *second*, holding, in substance, that patents are not entitled to cover *functional* equivalents, but only *mechanical* equivalents, and that the Boyden apparatus

contains no mechanical equivalent of Mr. Westinghouse's auxiliary, or emergency, valve. In obedience to the mandate of the Circuit Court of Appeals, Judge Morris dismissed the Bill of Complaint in the Court below. The complainants then applied for a writ of *certiorari* from this Court to the Circuit Court of Appeals, under Act of March 3, 1891, and it was granted, thus bringing the whole controversy before this Court for review.

As the result of Judge MORRIS' decision, your petitioners were under injunction from the 25th day of April, 1895, to the 16th day of December, 1895, and were thereby subjected to heavy loss, damage and injury to their business.

The pendency of this suit during the long period from the filing of the Bill of Complaint till the decision of the Circuit Court of Appeals—six years—was also very disastrous to your petitioners' business. The railroad companies throughout the country were warned by the complainants not to buy your petitioners' air-brakes, and the great majority of them did not dare to buy while the litigation was still undecided. The complainants thus succeeded in making the mere fact of a pending suit operate substantially with the same effect as an injunction. After the decision of the Circuit Court of Appeals, your petitioners were for the period of about two months relieved from this interference with their business; but since this Honorable Court has granted the writ of *certiorari*, renewing and continuing the litigation after it was believed to have been ended, your petitioners again find their business ruinously obstructed and substantially stopped, so that, although clear of Judge MORRIS, injunction, they practically might as well be under it.

To increase the timidity of the railroads and ensure the destruction of your petitioners' business, the Westinghouse Company has recently adopted the policy of bringing suits against the railroads, charging them, in one case, with infringing said patent, No. 360,070, by allowing a single freight car equipped with your petitioners' air-brakes to be hauled over their tracks, although the car in question belonged to some other railroad. And thus it has come to pass

that, although by the unanimous judgment of the Circuit Court of Appeals for the Fourth Circuit, your petitioners have as clear a right to put out their air-brake as the Westinghouse Company has to put out its own, yet they have been for the long period of six years, and now are, prevented from so doing, while their adversary has been, and still is, reaping the entire profits of this vast business, even to the extent of declaring dividends of 40 per cent. per annum on a capital stock of \$5,000,000. Justice and equity demand that this condition of affairs shall not be allowed to continue one day longer than is absolutely unavoidable. Your petitioners respectfully submit that on this ground alone the hearing in this case should be advanced.

2. But, we respectfully submit, there is another and still stronger reason why it should be advanced.

Unless advanced, a decision could hardly be reached before the end of the year 1897, if, indeed, so early as that. But if the decision of this Court be delayed till the last half of 1897, then, even though it be in our favor, we shall be practically robbed of the entire value of our patents and our large and valuable business interests will have been irreparably damaged and all its substantial profits handed over the Westinghouse Air-Brake Company. For, by the Act of 1893, 27 Stat. at Large, p. 531, chap. 196, entitled

“An Act to promote the safety of employees and travelers upon railroads by compelling common carriers engaged in interstate commerce to equip their cars with automatic couplers and continuous brakes and their locomotives with driving-wheel brakes, and for other purposes,”—

all railroads engaged in interstate commerce must be fully equipped with power brakes on or before the first day of January, 1898, or suffer a heavy penalty. All freight cars may be said to be engaged in interstate commerce, as they go from one road to another, and practically wander all over the country, even although the railroad which owns them may be a short line lying within a single State. It is, therefore, imperatively necessary for every railroad in the country to

fully equip its cars with air-brakes prior to January 1, 1898. In fact, the railroads have for a long time been, and now are, actively endeavoring to comply with the provisions of said Act. The effect of the Act is, therefore, to compel the railroads to spend about \$32,000,000 within the next two years in providing their freight cars with air-brakes; and the effect of your Honors' refusal to advance this cause would be to give that entire business to the Westinghouse Company; and if your Honors' decision should finally be rendered in our favor, as we confidently expect it will be, it will give us the shadow and not the substance—the mine, after all the ore has been extracted by our adversaries.

Even if this condition of things had come about by natural causes, it would, we respectfully submit, appeal strongly to your Honors to advance and expedite the hearing of this cause; but when we consider that it is a situation forced upon us directly by the intervention of the legislative department of the Government, it would seem that the judicial department ought to give us what relief it can by advancing the hearing of our cause, to save us from a disaster which Congress certainly did not contemplate when it passed the act. The government has given us our patents; the Circuit Court of Appeals, whose decision in patent cases is ordinarily final, has unanimously declared our right to the free use of them; Congress has intervened to render that right practically worthless unless it can be exercised promptly; and this Honorable Court, by granting the writ of *certiorari*, has cut us off from the present enjoyment of that right, and jeopardized our chances of ever enjoying it, even though your Honors' decision should ultimately be in our favor. The only way in which relief can now come is by a speedy hearing and adjudication of the merits of our cause. If left to take the usual course, the injury to us will be irreparable.

3. The case is one of great public importance and interest; otherwise, under the repeated decisions of this Court, the writ of *certiorari* would not have been granted. The same reason of public importance which led to the

grant of the writ of certiorari by this Court leads equally to the advancement of the hearing; and, when supplemented as it is by the other potent considerations hereinabove referred to, and by the fact that justice, in this case of great public importance, will be absolutely denied unless a speedy trial can be had, it would seem to appeal with irresistible force.

The public importance of the case arises not merely from the great sum of money at stake, but from other facts as well. The use of air-brakes, by enabling the speed of freight cars to be doubled with safety, in effect nearly doubles the entire traffic capacity of the railroads of this country. They are also life-saving and property-saving devices of such public value that, as we have seen, Congress has taken the unusual course of making their immediate use imperative. The importance of such use on all the railroads of the country having thus been authoritatively declared by the National legislature, it is of great public importance that the Act of Congress should be faithfully complied with. But there are over 1,000,000 freight cars in use in this country, of which, during the eight years since these quick-action brakes came upon the market, less than 400,000 have been equipped therewith,—leaving over 600,000, and perhaps more than 700,000, to be equipped before January 1, 1898,—and it is doubtful if the Westinghouse Company, with all its facilities, can supply this demand within the next two years. It is, therefore, highly important to the public, and to the execution of this law, that your petitioners shall have their rights adjudicated at the earliest possible moment, to the end that, if found to be lawfully entitled to manufacture and sell the Boyden brake, as they believe will be the fact, they may be dismissed from this litigation in season to render the railroads effective aid in securing the required brake equipment within the time limited by Congress.

But even if the Westinghouse Company should be able within the next two years to furnish all the air-brakes necessary to fulfill the requirements of the Act of Congress,

still it is important to the public interests that there shall be a wholesome competition in the business, as will be the case if your petitioners are free to enter the field. Otherwise, the railroads, carriers of the United States mail, confronted on the one hand by an Act of Congress which compels them to provide these requirements by January 1st, 1898, and on the other hand by a company which is allowed to exercise the exclusive privilege of furnishing said equipments at prices controlled only by themselves, will be liable to be ground between the upper and lower millstones of corporate greed. The dividends of the Westinghouse Company show that these brakes can be made and sold at a handsome profit at prices far below those heretofore exacted, and it is obviously for the public interest that competition in this important field of industry should not be kept suppressed, nor an absolute monopoly continued any longer than is imperatively necessary.

4. Cases involving patents of great value, where, by reason of litigation, the patentee is practically excluded from the enjoyment of his invention for years after the grant of his patent, as in the present instance, present strong claims for an immediate adjudication, and for an advancement upon the calendar if necessary to that end. In the judgment of Congress, a seventeen-year monopoly is the proper reward for a meritorious inventor who has contributed to the promotion of the useful arts. Every day's delay in the final adjudication of such a case cuts off a day from the life of the inventor's protection. Your petitioners' patents have already been shortened to about thirteen years; and, if your Honors should not advance this hearing, they will be further shortened to about eleven years, commencing after the most important profits of the business will have been absorbed by the adversary who has caused the loss of one-third of the life of our patents.

5. Your petitioners stand before this Honorable Court with the legal presumption that they have the right to manufacture, sell and use the Boyden quick-action air-brake—a presumption arising out of the unanimous decision

of the Circuit Court of Appeals upon that question. Your petitioners' right to produce and vend these brakes is founded upon the fact that the Boyden brake is an invention wholly different from that of Mr Westinghouse, and in no legal or equitable sense an infringement of his patent. They do not question the validity of Mr. Westinghouse's patent, nor deny his right to the exclusive use of his invention till the end of the term. Their position is, that his patent must be construed as covering only his invention, and that it does not cover the production of the same result by other and different means which are not the mechanical equivalents of his means. Their interpretation of his patent is precisely the same as that adopted by His Honor, Judge LACOMBE, and by the Circuit Court of Appeals for the Second Circuit, in the case against the New York Air-Brake Company, referred to in the complainants' papers on the application for a *certiorari* in this case. In this construction of the Westinghouse patent, the Circuit Court of Appeals for the Fourth Circuit agreed with your petitioners and with Judge LACOMBE and the New York Circuit Court of Appeals, and directed the complainants' bill to be dismissed with costs. Your petitioners have never understood, and do not now understand, the decision of the Circuit Court of Appeals in this case as going beyond the question of infringement. It is true that there is, in the *opinion* of that Court, one expression intimating that the broad terms of the second claim are "fatal," which expression, read without reference to other parts of the opinion, might lead to the conclusion that the Court was disposed to hold said claim invalid; but your petitioners and their counsel have always understood that expression to mean "fatal, unless limited, by construction, to the invention made by Mr. Westinghouse," and in this view they are borne out by the fact that, in another part of the opinion, the Court discussed the effect of the words in the claim, "substantially as described," and held that they required the patent to be limited as above stated.

In the application for a *certiorari*, said expression, however, was cunningly removed from its context and held up

before this Court, apart from the rest of the opinion, as showing that there was a direct conflict between the judgments of the two Circuit Courts of Appeal, although counsel well knew that the validity of the Westinghouse patent was openly admitted by your petitioners and their counsel in their arguments and briefs used on the trial of the case at Richmond. How far this subtle proceeding may have influenced your Honors to grant the writ of *certiorari*, we do not know; but if it had any influence at all in that direction, an additional reason is thereby furnished for a speedy adjudication of the case, in order that the complainants may not profit by their own wrong, by which they have succeeded in again tying up your petitioners' business for an indefinite time.

6. The hearing and adjudication of the case will not impose upon your Honors a long and arduous labor. The points to be decided are but two in number, viz:

(a) Is the Westinghouse patent to be construed as limited to Mr. Westinghouse's auxiliary or emergency valve, as held by the Circuit Court in New York and the Circuit Courts of Appeals of the Second and Fourth Circuits; or, on the other hand, is it to be construed as covering a *result*, and as infringed by a structure which does not contain such auxiliary or emergency valve, as held by Judge Morris in Baltimore?

Your Honors have already decided the law of this question too many times to need much further consideration of it now.

(b) Is the Boyden combination the same in mode of operation and mechanical means as the Westinghouse combination; or, on the other hand, is it a new and different invention, accomplishing its result by other means and a different mode of operation, as unanimously held by the Circuit Court of Appeals for the Fourth Circuit, and substantially conceded even by Judge Morris in his opinion?

The solution of this question needs merely a thorough understanding of the two structures and of the Westinghouse patent.

No question of prior invention, anticipation, or public use, is raised, but simply the question of infringement. The case, therefore, involves no unusual amount of labor on your Honors' part. It can be heard and decided before the end of this term, without seriously interfering with the other business of the Court. To postpone it to October would use up about one-third of the time available to your petitioners under the Act of Congress above referred to.

Your petitioners are fully sensible of the great labor devolved upon this Court in the ordinary transaction of its business; and but for the turn that affairs have taken, and the pressure of the Act of Congress, which threaten to destroy their important and valuable interests, they would not ask your Honors to intervene in their behalf, but would await the regular call of the calendar, although thereby losing two years of the life of their patent protection and their business. Under existing circumstances, however, they have no recourse but to apply to your Honors for relief, which they feel should be awarded both on the ground of the public interests and for the prevention of the grievous wrongs which your petitioners are now suffering. It will be seen that, in the language of Rule 26, paragraph 7, the "circumstances" of your petitioners' case are "special and peculiar," and such as are never likely to arise again in any other case; so that, by granting this relief, in view of the peculiar effect of the Act of Congress referred to, no precedent will be established that will be liable to embarrass this Court in the future.

BOYDEN POWER BRAKE COMPANY.

By G. A. BOYDEN, *President*.
C. B. MANN, *Secretary*.
W. WHITRIDGE, *Treasurer*.

And BOYDEN BRAKE COMPANY,

By G. A. BOYDEN, *President*.

LYSANDER HILL,

Counsel for Petitioners.

STATE OF MARYLAND, }
CITY OF BALTIMORE, } ss.

George A. Boyden, having been duly sworn, deposes and says: That he is one of the above-named petitioners; that he has read said petition, by him subscribed, and understands the contents thereof; and that the statements of facts therein contained are true to the best of his information and belief.

G. A. BOYDEN.

Subscribed and sworn to before me this 14th day of March, A. D. 1896.

GEO. E. TAYLOR,
Notary Public.

